

EXHIBIT 9

FILED UNDER SEAL

UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF TEXAS

SHERMAN DIVISION

The State of Texas, et. al.

Plaintiff,

v.

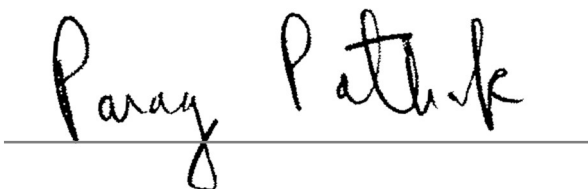
Google LLC,

Defendant.

Case No: 4:20-cv-00957

Expert Rebuttal Report of Parag Pathak

September 9, 2024

A handwritten signature in black ink, reading "Parag Pathak", is written over a horizontal line.

Parag Pathak

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I. ASSIGNMENT

1. On December 16, 2020, a multistate coalition led by the State of Texas filed a lawsuit against Google LLC (“Google”) asserting violations by Google of federal and state antitrust laws and violations of other state laws, in connection with Google’s conduct in the online display advertising industry and as to digital advertising technologies (“Ad Tech” or “Ad Tech stack”). Currently, 16 States (Texas, Alaska, Arkansas, Florida, Idaho, Indiana, Kentucky, Louisiana, Mississippi, Missouri, Montana, Nevada, North Dakota, South Carolina, South Dakota, and Utah) and the Territory of Puerto Rico are Plaintiffs in the case (“Plaintiff States”). I was retained in July 2021 by Plaintiffs’ counsel to provide expert analysis and opinions on behalf of the Plaintiff States.

2. I previously filed a report in this matter (“Opening Report”).¹ In my Opening Report, I opined that well-functioning digital advertising marketplaces should aim to maximize the surplus of their participants, market clearing rules and terms of trade should be made known to all participants, and that a marketplace with more participation will lead to more opportunities to find matches and more total surplus. I also opined that Google’s anticompetitive conduct resulted in digital advertising marketplaces that do not function well because they do not follow these principles.

3. My Opening Report provides details of my qualifications, testifying experience, and publications, which are unchanged since my Opening Report.²

4. I have now been asked by counsel for the State of Texas, on behalf of all Plaintiff States in this case, to review and respond to the opinions related to market design and incentives

¹ Expert Report of Parag Pathak, Ph.D., The State of Texas, et al., v. Google, LLC, Case No: 4:20-cv-00957, June 7, 2024. (“Pathak Report”)

² Pathak Report at Section III, ¶10. “My main research focus is in market design, a branch of microeconomics that studies the design and performance of market-clearing institutions. My research and teaching are on matching, auctions, platforms, centralized trading systems, and other resource allocation systems. I have been awarded teaching prizes, including the MIT Graduate Economics Association Teacher of the Year award, and the Undergraduate Economic Association Teaching Award. I have written extensively on market design in a variety of contexts. I have published over 50 peer-reviewed papers in the *American Economic Review*, *Econometrica*, *Quarterly Journal of Economics*, *Journal of Political Economy*, *Journal of Financial Economics*, among others.”

Pathak Report Appendix A contains my CV.

submitted on behalf of the Defendant by Professors Paul R. Milgrom³, Michael R. Baye⁴, and Anindya Ghose^{5,6} None of these reports alter my conclusions from my Opening Report.

5. A list of all documents referred to in this report and relied upon by me in forming my opinions in this case is attached in Appendix A.

6. A list of all documents, including transcripts, considered in this report is attached in Appendix A. I understand that document productions are ongoing in this case and that additional relevant documents may be produced in this case by Google and third parties right before and after I issue this report. I also understand that, after I submit this Rebuttal Report, expert and fact witnesses for Google and the U.S. Department of Justice and other plaintiffs will be testifying at trial in the parallel case pending in the Eastern District of Virginia (United States et al. v. Google LLC, No. 1:23-00108). I may, and reserve the right to, review and rely on additional documents, including transcripts, and testimony in conducting my work and forming my opinions in this case. I reserve the right to supplement or amend this report if my opinions change or require supplementation as a result of my ongoing review of documents and to create and use graphics, figures, and/or other illustrations at trial to support my conclusions.

7. In preparing this report, I was compensated at a rate of \$1,200/hour. I was assisted by a research team under my direction. My compensation is not contingent upon my opinions or the outcomes of this matter.

II. SUMMARY OF OPINIONS

8. In my Opening Report, based on my application and analysis of generally accepted market design methodologies and principles, I opined that (a) well-functioning digital advertising

³ Expert Report of Paul R. Milgrom ("Milgrom Report"), July 30, 2024

⁴ Expert Report of Michael R. Baye ("Baye Report"), August 6, 2024.

⁵ Expert Report of Anindya Ghose ("Ghose Report"), July 30, 2024.

⁶ I have also reviewed the Expert Report of Jason Nieh, but will not respond at this time to opinions of Profs. Nieh, Baye, and any others related to remedies based on the Bifurcation Order entered by the Court in this case. I have also reviewed the report of Prof. Steven Wiggins, whose opinions about RPO do not change my opinion on the importance of transparency of auction rules. Pathak Report at ¶153, "Transparency improves participants' ability to make choices and have enough information about how the market works to make well-informed decisions. Transparency ensures the participants are safe to reveal their information such as their willingness to pay without being worse off for disclosing. Well-designed matching process account [for] the fact that participants are making strategic decisions. Sometimes the goal of the market designer is to reduce the need to game the system, allowing choosers to concentrate on identifying their true needs and desires. Other times the goal is to ensure that even if some gaming is inevitable, the market can still work clearly. A good marketplace makes participation safe and simple." Roth, A.E., *Who gets what and why: the new economics of match making and market design*, Houghton Mifflin Harcourt, 2015, at p. 11.

marketplaces should aim to maximize the surplus of their participants, (b) market clearing rules and terms of trade should be made known to all participants, and (c) a marketplace with more participation will lead to more opportunities to find matches and more total surplus. I described how Google's anticompetitive conduct, discussed by Professor Gans, has resulted in digital advertising marketplaces that do not function well because they do not follow these principles.

9. I have reviewed the expert reports of Profs. Paul R. Milgrom, Michael Baye, and Anindya Ghose. Considering their opinions and analyses, I maintain the opinions I offered in my Opening report.

10. Profs. Milgrom, Baye, and Ghose do not rebut the market design analytic framework I offered in my Opening Report. Indeed, Professor Milgrom embraces my market design analytic framework when he states that platform design and intermediation increases economic welfare by making it easier for publishers and advertisers to transact, by making the platform thicker and have better information, and by making processes more efficient.⁷ Professor Milgrom cites Stanford University economist Alvin Roth for articulating these ideas, which is the same source as my Opening Report.⁸

11. Profs. Milgrom and Ghose offer a selective and misleading account of the history of Google's programs. Their description ignores how Google's programs led to poor outcomes for publishers and advertisers to benefit Google. The industry responded to Google's conduct by attempting to create more opportunities for trade only to be thwarted by Google's efforts.

12. Profs. Milgrom and Baye's argument that Google, and not competition, should balance the interests of advertisers and publishers are pretextual and ex-post rationalizations of its conduct that do not accord with the record. Rather than expanding choices and options for publishers and advertisers, Google's cross-market programs restricted choice. The supposed "problems" that Profs. Milgrom and Baye identify and claim that Google addressed are either not

⁷ Milgrom Report at ¶43. "Common approaches taken by intermediaries that increase economic welfare include: Making it easier for publishers and advertisers to transact."

⁸ See Pathak Report at FN 33. "Well-designed matching process account the fact that participants are making strategic decisions. Sometimes the goal of the market designer is to reduce the need to game the system, allowing choosers to concentrate on identifying their true needs and desires. Other times the goal is to ensure that even if some gaming is inevitable, the market can still work clearly. A good marketplace makes participation safe and simple." Roth, A.E., Who gets what and why: the new economics of match making and market design, Houghton Mifflin Harcourt, 2015, at p. 11.

substantial problems, the result of Google's own conduct, or do not require a single firm, Google, to address instead of competitive market forces.⁹

13. Professor Baye's claims that Google's integrated "Ad Tech stack" effectively internalizes externalities, reduces free-riding, and is uniquely positioned to increase quality are unreliable. Google had no incentive to improve overall market thickness because it focused on maximizing impressions trafficked on its exchange AdX. Professor Baye's analysis has not shown that Google is better positioned than contractual or competitive market forces to increase thickness, and his claim that equitable interoperability creates free-riding externalities is unsupported. Finally, he ignores the fact that firms have strong incentives to improve their quality to compete and attract consumers, and integration is not necessary to support quality investment.

III. MY ANALYTIC FRAMEWORK AND OPINIONS REFLECT GENERALLY ACCEPTED MARKET DESIGN METHODOLOGIES AND PRINCIPLES AND REMAIN UNCHANGED IN THE FACE OF GOOGLE'S EXPERT REPORTS

14. In my Opening Report, I apply market design frameworks to understand how well-designed marketplaces can maximize efficiency, or surplus, for publishers and advertisers.¹⁰

15. As I discuss in my Opening Report, market design is a branch of microeconomics that studies the design and performance of market-clearing institutions. Market design economists have found that marketplaces become thick when they encourage participation; and that they become safe when marketplace rules are transparent and when participants have

⁹ See David M. Kreps, 2012. "Microeconomic Foundations I: Choice and Competitive Markets," Economics Books, Princeton University Press, edition 1, volume 1, number 9890: "From the earliest days of academic economics (which is to say, from the time of Adam Smith), economists have written paeans of praise to competitive markets. "The invisible hand of prices coordinates the activities of myriad producers and consumers in an efficient manner, and moreover in a manner that, experience has taught us, centrally planned and administered economies cannot match. ""

¹⁰ Pathak Report at ¶39. "Market designers consider the key elements of successful markets. Market design economist Alvin Roth summarizes that "To function properly, markets need to do at least three things: 1. They need to provide thickness—that is, to bring together a large enough proportion of potential buyers and sellers to produce satisfactory outcomes for both sides of a transaction. 2. They need to make it safe for those who have been brought together to reveal or act on confidential information they may hold. When a good market outcome depends on such disclosure, as it often does, the market must offer participants incentives to reveal some of what they know. 3. They need to overcome the congestion that thickness can bring, by giving market participants enough time—or the means to conduct transactions fast enough—to make satisfactory choices when faced with a variety of alternatives." Roth, A.E. (2007). *The Art of Designing Markets*. *Harvard Business Review*.

straightforward incentives.¹¹ I have found these first- principles of market design (“Market Design Principles”) in my own research as well.¹²

16. It remains my opinion that applying these general principles of market design in the context of Google’s conduct demonstrates that Google’s conduct reduced thickness and transparency for publishers and advertisers resulting in inefficient allocations in the marketplace.¹³ In addition, in my Opening Report, I analyzed Google’s incentives to act upon conflicts of interest that arise from Google’s ownership of the ad server, exchange, and buying tools.¹⁴

17. In a well-functioning market, publisher ad servers would have an incentive to offer tools and services that best meet the needs of their publisher customers so as to attract more publisher customers. Likewise, ad buying tools would have an incentive to offer tools and services that best meet the needs of their advertiser customers.¹⁵

18. Publisher ad servers can help publishers maximize their revenue by helping them offer their inventory across a wide variety of exchanges.¹⁶ Publishers can increase revenue

¹¹ See Haeringer, G. *Market Design: Auctions and Matching*. Chapter 1.3.1 What a Market Needs to Work. The MIT Press, 2017. pg. 3-4. See also Roth, A.E. (2007). *The Art of Designing Markets*. Harvard Business Review. Available at <https://hbr.org/2007/10/the-art-of-designing-markets>.

¹² Pathak Report at ¶40, “In my own research, I have found that markets become thick when they encourage participation; become safe when participants have transparency about the rules of the market and when participants have straightforward incentives.” Pathak P.A. *What Really Matters in Designing School Choice Mechanisms* in: Honoré B, Pakes A, Piazzesi M, Samuelson L, eds. *Advances in Economics and Econometrics: Eleventh World Congress*. Econometric Society Monographs. Cambridge University Press; 2017:176-214

¹³ Pathak Opening at ¶19-20 “Google’s requirement that publishers who use its DFP ad server must license Google’s AdX worked against the interests of publisher customers by limiting their choice and protected AdX from the threat of disintermediation. Google Ads exclusivity to AdX denied advertisers the option to participate on other third-party exchanges, where they could have found better matches and realized greater surplus.[...]Google also deployed deceptive conducts which lowered transparency for publishers and advertisers.”

¹⁴ Pathak Report at ¶96. “Google acts on its conflicts of interest by taking actions that are contrary to the principles of market design I outlined above which give rise to well-functioning marketplaces. Google reduces marketplace efficiency by acting contrary to these principles of market design. publishers and advertisers to use multiple exchanges to obtain the most relevant matches and maximize gains from trade which leads to marketplace efficiency. In contrast, Google has an incentive to steer publishers and advertisers towards trading on its AdX exchange alone.”

¹⁵ If publishers and advertisers are dissatisfied with a product and switching is easy, they will switch. Therefore firms have an incentive to align their goals with their customers. Becker, Gary S. “Irrational behavior and economic theory.” *Journal of Political Economy*, vol. 70, no. 1, 1962, pg. 1-13. See also Hirschman, Albert O.. *Exit, Voice, and Loyalty*. (1970).

¹⁶ Pathak Report at ¶93, “Publishers seek to maximize revenue, while maintaining a commensurate level of quality. Publishers can increase revenue when they have access to many exchanges.”

through increased participation on exchanges, which increases the likelihood of finding a relevant match.¹⁷

19. Likewise, ad buying tools can help advertisers maximize their return on investment by bidding across multiple exchanges to increase the likelihood of finding a relevant match.¹⁸

20. Similarly, ad exchanges maximize surplus in the marketplace by facilitating relevant matches between publishers and advertisers. To maximize the number of matches, ad exchanges have incentives to increase thickness by interoperating with many publisher ad servers and ad buying tools.¹⁹

**IV. PROFS. MILGROM AND GHOSE’S INDUSTRY ANALYSES IGNORE HOW
GOOGLE’S PROGRAMS LED TO INEFFICIENT OUTCOMES FOR PUBLISHERS
AND ADVERTISERS AND DO NOT CHANGE MY OPINION THAT GOOGLE
ACTED ON ITS CONFLICTS OF INTERESTS**

21. Professors Milgrom and Ghose state that Plaintiffs ignore the historical context of Google’s programs.²⁰ Their opinions on historical context do not change my opinion that display advertising marketplaces do not function well when they do not follow the “Market Design Principles.”²¹ In addition, Profs. Milgrom and Ghose’s Reports fail to address the most important historical context of all: the DFP-AdX tie.

¹⁷ [REDACTED]

¹⁸ Pathak Report at ¶194. Likewise, advertisers seek to maximize return on investment from purchasing advertisements. Advertisers can increase this return by accessing multiple exchanges because this broadens the set of available publisher inventory, and exchanges may compete on the fees they charge to advertisers. [REDACTED]

[REDACTED] - Internal Google presentation.

¹⁹ Pathak Report at ¶192. “As the middleman between advertisers and publishers, AdX seeks to maximize the number of publishers and advertiser who join and transact on the tool. Exchanges typically compete based on the price (take rates), quality of inventory and demand. If Google were an independent exchange, it would compete on price and the number of buyers and sellers it can attract.”

²⁰ Milgrom Report at ¶20. “In several cases, Plaintiffs’ and their experts’ assessments of Google’s conduct overlook this historical context.”

Ghose Report at ¶201. “Not only do Plaintiffs’ experts’ theories focus on a narrow slice of online display advertising (as described in Section III), but they also omit and mischaracterize the development of display advertising technology to paint a flawed picture of Google’s conduct.”

²¹ Pathak Report at ¶19. “The anticompetitive conduct discussed by Professor Gans has resulted in digital advertising marketplaces that do not function well because they do not follow these principles.”

22. As I explain in my Opening Report, each of Google's conducts reduces the market-wide thickness, or number of matches, available to publishers and advertisers.²² The tie ensures that publishers do not leave DFP, which is the instrument that allows Google to carry out conduct that reduces choice.²³

A. Profs. Milgrom and Ghose ignore the historical context for the tie, Google Ads' exclusivity, and the DFP-AdX tie's effect on Google's other conducts

23. Profs. Milgrom and Ghose do not address Google’s conduct in the context of its tie between its ad server (DFP) and ad exchange (AdX), as well as the exclusivity of Google Ads to AdX. With the tie and Google Ads exclusivity, Google reduced the number of relevant matches that publishers and advertisers can make.²⁴

24. Profs. Milgrom and Ghose fail to address that Google's strategy across time has been to strengthen the tie between DFP and AdX to exclude competition from rival ad exchanges. As I explain in my Opening Report, as early as 2009, [REDACTED]

[REDACTED] In addition, AdX

²² Pathak Report at ¶113. “Google Ads exclusivity to AdX denied advertiser participation on third-party exchanges, where advertisers could have found relevant matches. The lack of participation created marketplace inefficiency because advertisers could only buy from publishers that used AdX, not other exchanges, limiting the total inventory available for bidding. For instance, it is inefficient for Google Ads advertisers to miss relevant inventory from non-AdX publishers. Under the exclusive arrangement between Google Ads and AdX, Google Ads advertisers had less availability to make relevant matches.”

Pathak Report at ¶124. “Without real-time prices, publishers on third-party ad servers must consider where they place AdX in their waterfalls. If the publisher sets AdX first in its waterfall, then AdX will have access to all available inventory, but the publisher may miss out on another exchange willing to purchase the inventory for more. If the publisher sets AdX lower in its waterfall, then AdX is only called when other exchanges have already passed over the inventory.”

Pathak Report at ¶126. “Restricting access to real-time prices also lowers marketplace efficiency for advertisers on AdX. If publisher does not rank AdX highly in its waterfall, advertisers will have less available inventory for bidding. In addition, by being lower in the waterfall, the inventory may be lower quality and less likely to be a good match for advertisers.”

²³ Pathak Report at ¶132. “The effects of these strategies [the tie] are felt by rival ad servers and publishers. In a deposition, [

²⁴ On DFP, had Google expanded 3rd party dynamic allocation, more ad servers could have offered inventory to AdX. One example is

On Google Ads exclusivity,

²⁵ Pathak Report at ¶¶102-104.

only gave real-time access to DFP and not to other ad servers.²⁶ By denying third-party ad servers real-time access to AdX, Google denied advertisers on its exchange the opportunity to match with a publisher on another platform.²⁷ As I discuss in my Opening Report, Google could have provided third-party ad servers the opportunity to receive real-time bids from AdX through its Third-Party Dynamic Allocation program.²⁸ [REDACTED]

25. Likewise, Profs. Milgrom and Ghose ignore the impact of Google Ads' exclusivity. Google first made Google Ads exclusive to AdX to "boost the attractiveness of [Google's] sell side (AdX)."³¹ Internally, the Google Ads team understood that [REDACTED]

[REDACTED]

²⁶ [REDACTED]

²⁷ [REDACTED]

²⁸ Pathak Report at ¶117, "Google had two solutions for improving granting third-party ad servers to access to AdX that it abandoned to maintain the DFP-AdX tie. Google developed "Third-Party Dynamic Allocation," an internal program that would have allowed third-party ad servers to access AdX via an API. Google also acquired the technology to grant third-party ad servers access to AdX as part of its acquisition of AdMeld."

²⁹ Pathak Report at ¶118. "Third-party Dynamic Allocation would have given third-party ad servers better information on real-time prices in AdX and given AdX more access to inventory. In 2012, Google and European exchange and ad server Improve Digital were preparing to go live with third-party Dynamic Allocation. [REDACTED]

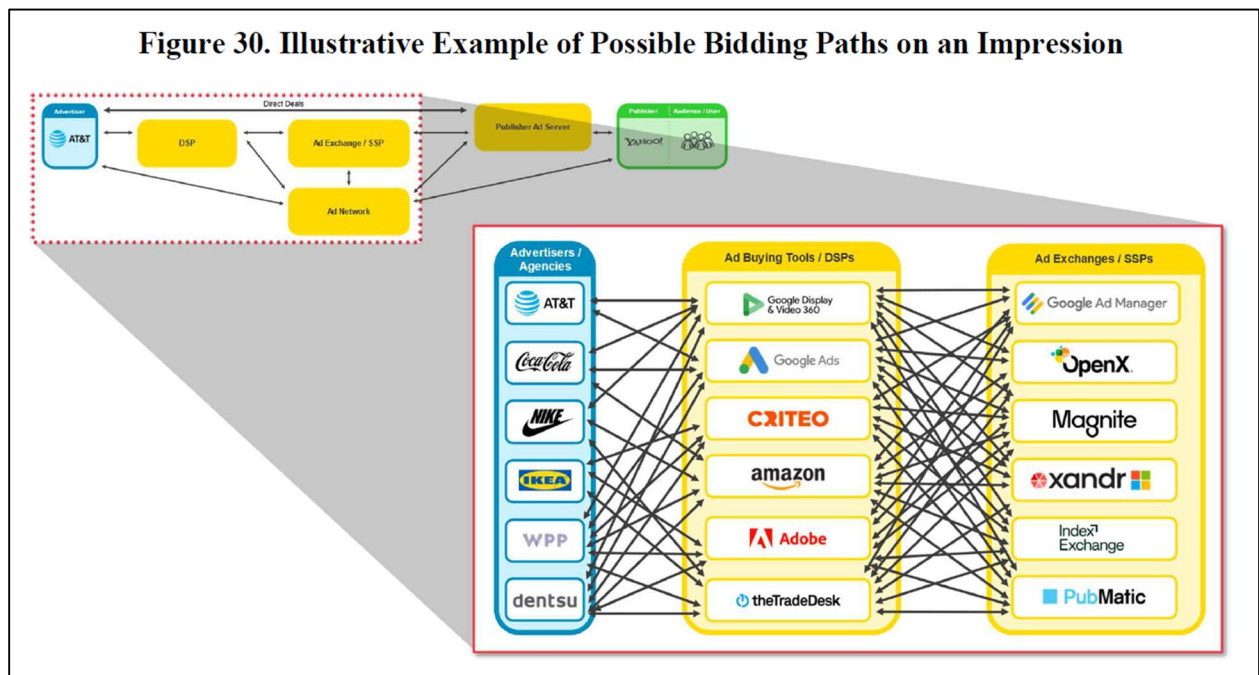
³⁰ Pathak Report at FN 130 [REDACTED]

³¹ Pathak Report at FN 109. [REDACTED]

³² Pathak Report at FN 115. [REDACTED]

26. In addition, in his industry analysis, Prof. Ghose overstates the relationship between Google Ads and third-party exchanges. Prof. Ghose states that “Google Ads[...] enables advertisers to buy ad space [...] (3) from publishers using third-party ad exchanges (e.g., PubMatic, OpenX, Microsoft (Xandr), Magnite, Index Exchange).”³³ He then states, “remember that many firms, in multiple levels of the ad tech stack, are involved in matching each impression to an advertiser” and presents the possible bidding paths in Figure 30. His Figure 30 is disingenuous because other exchanges do not have an equal access to AdX on the bidding path, as his figure would imply. Instead, AdX represents an average █████ of Google Ads impressions from 2013-2023.³⁴

Figure 1: Prof. Ghose Report Figure 30



³³ Ghose Report at ¶251. “As depicted in Figure 29, Google Ads—which includes the advertiser-facing side of Google’s ad network—enables advertisers to buy ad space (1) on Google’s owned-and-operated properties (like Search, YouTube, and Gmail); (2) from publishers using Google’s platforms— AdSense, Google Ad Manager (which includes Google’s ad exchange functionality), and AdMob (which focuses on in-app inventory); and (3) from publishers using third-party ad exchanges (e.g., PubMatic, OpenX, Microsoft (Xandr), Magnite, Index Exchange). These capabilities evolved over time.”

³⁴

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27. However, by implying that third-party exchanges are on the same bidding path as AdX, he ignores that third-party exchanges do not have equitable access to Google Ads compared to AdX. [REDACTED]

[REDACTED]

[REDACTED]

28. Google Ads exclusivity to AdX and the DFP-AdX tie are self-reinforcing. As Google leveraged Google Ads to attract publishers to AdX, it closed off alternative routes for publishers

³⁵ Pathak Report at ¶237. [REDACTED]

³⁶ [REDACTED]

to put inventory on AdX.³⁸ As a result, publishers adopted DFP to put inventory on AdX for Google Ads advertisers.³⁹

29. Profs. Milgrom's and Ghose's analyses are flawed because they do not analyze the effect of the tie on Google's additional sell-side conducts, such as Dynamic Allocation and Enhanced Dynamic Allocation ("DA and EDA"), the response to Header Bidding, and Unified Pricing Rules ("UPR"). With the tie, Google could launch conducts that led to worse outcomes for publishers without fear that publishers would switch to another ad server.⁴⁰

B. Profs. Milgrom and Ghose ignore the industry reaction to Dynamic Allocation

30. Profs. Milgrom and Ghose agree with my opinion that real-time, simultaneous bids are superior to the waterfall method.⁴¹ However, both Profs. Milgrom and Ghose ignore that Google gave Dynamic Allocation exclusively to AdX and not to other exchanges.

³⁸

³⁹

⁴⁰ Pathak Report at ¶134.

"Q

If participants are dissatisfied, they can switch. Becker, Gary S. "Irrational behavior and economic theory." *Journal of Political Economy*, vol. 70, no. 1, 1962, pg. 1-13. See also Hirschman, Albert O.. *Exit, Voice, and Loyalty*. (1970).

⁴¹ Pathak Report at ¶239, "As I discuss in Section X.B, publishers benefit when exchanges compete simultaneously for impressions over sequential calling. Sequential calling of exchanges yields less revenue for publishers because all potential sources of demand are not competing on price at the same time to obtain the match to a publisher's impression."

Ghose Report at ¶228, "Dynamic Allocation provided a significant improvement over static pricing in the waterfall: publishers gained the opportunity to obtain a higher price (CPM) if one was available from bidders on the DoubleClick Ad Exchange, while retaining the ability to sell inventory through other demand sources in the waterfall when bidders on the DoubleClick Ad Exchange did not supply the highest price."

Milgrom Report at ¶267, "Even so, by offering each impression sequentially to ad networks, the waterfall procedure could leave value on the table."

31. As I discuss in my Opening Report, by granting Dynamic Allocation to itself alone, Google tilted the playing field to benefit itself.⁴² Across time, Google used Dynamic Allocation to ensure that impressions went to AdX over other exchanges.⁴³

32. Profs. Milgrom's and Ghose's framing that Dynamic Allocation was "an important innovation offering large benefits for publishers,"⁴⁴ ignores the important industry response to Dynamic Allocation: Header Bidding. Publishers adopted Header Bidding to "bypass the favorable relationship [Dynamic Allocation] Google has set up between its ad server, DoubleClick for Publishers [DFP], and its exchange, AdX."⁴⁵ Google internal documents [REDACTED]

33. Unlike Profs. Milgrom and Ghose's contention that Google has solved problems for the industry, [REDACTED]

⁴² Pathak Report at ¶138, "Google did not offer Dynamic Allocation to other exchanges." [REDACTED]

⁴³ Pathak Report at ¶136; Google used Dynamic Allocation to ensure AdX had a steady supply of inventory and to increase AdX revenue. [REDACTED]

⁴⁴ Milgrom Report at ¶279, [REDACTED]

Ghose Report at ¶22 "Plaintiffs' experts ignore key facts to create the false impression that Dynamic Allocation (known as DA) was a feature launched by DoubleClick (later acquired by Google) to disadvantage real-time bidding and header bidding competitors. This theory ignores the benefits that Dynamic Allocation created for publishers..."

⁴⁵ Pathak Report at ¶142; Sarah Sluis, *AdExchanger*, "The Rise Of 'Header Bidding' And The End Of The Publisher Waterfall" (Jun. 18, 2015). Accessed on June 4, 2024. Available at <https://www.adexchanger.com/publishers/the-rise-of-header-bidding-and-the-end-of-the-publisher-waterfall/>.

⁴⁶ Pathak Report at ¶142; also, "It was in reaction to the integration between ADX and DFP which gave ADX real time pricing, but other exchanges only average pricing." GOOG-DOJ-13925574 at-574. [REDACTED]

⁴⁷ [REDACTED]

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34. Publishers and advertisers were quick to adopt Header Bidding. Google's

35. Internal [REDACTED] chats summarize the effect of Header Bidding thusly:

C. Profs. Milgrom and Ghose ignore Google's response to Header Bidding

36. Profs. Milgrom and Ghose fail to consider how Google responded to the industry adoption of Header Bidding. Google did not participate in the Header Bidding auctions and internally referred to the innovation as [REDACTED] 50

37. An internal Google presentation, shown below, described Header Bidding as a

48

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⁵⁰ Pathak Report at ¶147. Google did not participate in the Header Bidding, because Header Bidding

[REDACTED]

[REDACTED]

38. In addition, Prof. Ghose states that “Plaintiffs’ experts gloss over header bidding’s significant drawbacks,”⁵³ but Prof. Ghose ignores that that publishers are in the best position to weigh the costs and benefits, rather than Google.⁵⁴ Google’s own internal documents [REDACTED]

[REDACTED]

39. In addition, Profs. Milgrom and Ghose state Open Bidding is an example of Google’s “innovation” for publishers, while ignoring that the goal of Open Bidding was not to increase

⁵¹ [REDACTED]

[REDACTED]

⁵³ Ghose Report at ¶22 “While portraying header bidding as a technological advancement, Plaintiffs’ experts gloss over header bidding’s significant drawbacks, including latency, domain spoofing, increased risk of ad fraud, privacy issues, billing discrepancies, and self-competition. Some of these drawbacks impact not only advertisers and publishers, but internet users as well. By minimizing these drawbacks, Plaintiffs’ experts fail to recognize how Google’s Open Bidding addressed some of them, while providing publishers with another way to transact with advertisers.”

⁵⁴ When participants have the right information, they can make choices that best meet their needs and preferences. Stigler, George J. “The economics of information.” *Journal of Political Economy*, vol. 69, no. 3, 1961, pg. 213-225

⁵⁵ [REDACTED]

revenue for publishers, but to reduce use of Header Bidding. The “holy grail” impact of Open Bidding was “the reduction of [Header Bidding].”⁵⁶

40. Prof. Milgrom and Ghose also ignore historical context of the deals Google made around Exchange Bidding. For instance, as I discuss in my Opening Report, Google entered into an agreement with Meta (Facebook) [REDACTED]

[REDACTED]

41. In addition, as I will explain further in Section V.D.2 had Google participated in Header Bidding, issues such as Last Look would have been resolved, and publishers and advertisers would have benefited from increased thickness in exchanges. As I explain in my Opening Report, set-ups such as Header Bidding benefit publishers and advertisers by increasing thickness of matches available.⁵⁹

D. Profs. Milgrom and Ghose ignore Google’s role in obscuring auction results

42. Prof. Ghose argues that regarding Google’s auction manipulation programs, “Plaintiff’s experts fail to acknowledge that Google did indeed disclose its experiments and

⁵⁶ [REDACTED]

⁵⁷ [REDACTED]

⁵⁹ Pathak Report at ¶144, “Header Bidding was attractive to publishers because publishers could increase their yield with simultaneous bidding from multiple exchanges. Google stated that AdX does not have the same demand from advertisers as other exchanges, thus there is a benefit for publishers to introduce new exchanges. In addition, Google recognized that Header Bidding allows all exchanges to compete at every price point in real time, which maximizes yield for publishers. The increased revenue from Header Bidding “comes from actual bids competing with line items vs average bids.”

“To function properly, markets need to do at least three things: 1. They need to provide thickness—that is, to bring together a large enough proportion of potential buyers and sellers to produce satisfactory outcomes for both sides of a transaction.” Roth, A.E. (2007). The Art of Designing Markets. Harvard Business Review. Available at <https://hbr.org/2007/10/the-art-of-designing-markets>.

auction rules.”⁶⁰ He cites a Google disclosure that “Ad Manager may run limited experiments designed to optimize the auction.”⁶¹

43. Prof. Milgrom also mischaracterizes my analysis, claiming that it ignores the ability of and incentives for advertisers and publishers to optimize their behavior.⁶² Prof. Milgrom claims that when the auction rules change, one would expect the bidders to behave differently. However, he omits from his argument that when auction rules are not disclosed, a bidder’s ability and incentives to change their behavior are hindered.

44. Consider a second-price auction. For these purposes, let’s assume that bidders would bid their true values. For instance, if we have 3 bidders, with value 10, 8 and 6, the bidder with value 10 wins, and the auctioneer earns 8. Now suppose Google secretly changes the format to a first price auction without informing bidders of the change. If all bidders continue to think it’s a second-price auction, they will continue to bid their true valuation, resulting in worse outcomes for the bidders but higher revenues for the auctioneer. Then in our example, the auctioneer’s revenue increases to 10. The bidders don’t know how to bid in this situation, so they report the truth.⁶³

45. In addition, Prof. Ghose’s report is against transparency in auction algorithms, stating that “In fact, transparency in auction algorithms could lead to adversarial behavior and exploitation. For instance, advertisers or publishers might game the system by reverse-engineering the algorithms to manipulate bids or floor prices to exploit vulnerabilities, preventing the auction from performing as designed for both buyers and sellers.”⁶⁴ Ironically, Prof. Ghose

⁶⁰ Ghose Report at ¶145.

⁶¹ Ghose Report at FN 436. “Auction Model,” Google Ad Manager Help, available at <https://support.google.com/admanager/answer/152039> (Google’s help center disclosure of its auction model, including that “[t]he net bid takes into account Google’s revenue share and reflects auction optimizations,” and that “Ad Manager may run limited experiments designed to optimize the auction,” and describing the types of experiments involved); GOOG-DOJ-14149648 (an earlier version of the “Auction Model” article with similar language: “DoubleClick Ad Exchange determines the winning bidder based on the highest net bid submitted. Such net bid reflects any adjustments Ad Exchange may, at its discretion, have made to the bid submitted by the buyer for purpose of optimizing the auction. [...] The Google DoubleClick Ad Exchange may run limited experiments designed to optimize the auction.”). GOOG-DOJ-14149648 at-49. Undated. “Allow competition to maximize auction revenue” - Google internal document.

⁶² Milgrom Report at ¶25. “Plaintiffs and their experts routinely underestimate or understate the ability of and incentives for advertisers and publishers to optimize their behavior when Google introduces or modifies its auction programs. It is my opinion that accounting for advertiser and publisher incentives to respond to auction programs is necessary to evaluate correctly the economic effects of these programs, and Plaintiffs’ experts’ analyses that fail to do so are unreliable.”

⁶³ This property is called “strategyproofness” and “truthfulness” in the auction literature. More specifically, an auction procedure is truthful if submitting their true values for the auctioned item as their bids is the best strategy for the bidders. For further information, see Vickrey, W. (1961). Counterspeculation, Auctions, and Competitive Sealed Tenders. *The Journal of Finance*, 16(1), 8–37. Available at <https://doi.org/10.2307/2977633>.

⁶⁴ Ghose Report at ¶147.

has described Google's Bernanke, DRS, and RPO conduct. Bernanke uses data from Google Ads auctions to manipulate bids for future AdX auctions, and DRS and RPO both manipulate floor prices.

46. Prof. Ghose's report fails to realize that transparency in auctions rules, or how the auction clears, is relevant to a well-designed marketplace. As I explain in my Opening Report, participants in well-designed matching marketplace need to know how impressions are cleared. The auction rules determine how much information publishers and advertisers should disclose, and obscuring rules makes the auction less safe for publishers and advertisers to reveal information.⁶⁵

47. Furthermore, neither Prof. Ghose nor Prof. Milgrom considers Google's efforts to conceal programs such as RPO and DRS before their public announcement and Project Bernanke's continued secrecy. In my Opening Report, I explain how secret programs reduce transparency.⁶⁶

1) Google's effort to conceal RPO

48. Prof. Milgrom argues that RPO was communicated as early as 2014.⁶⁷ However, Prof. Milgrom cites an ambiguous disclosure that Google "may run limited experiments...[that] include modifying the standard auction model or mechanics." In addition, Google ensured that RPO remained secret, as I detail in this section. Prof. Milgrom's assertions regarding Google's

⁶⁵ Pathak Report at ¶153, "Transparency is the ability of market participants to understand the rules of the marketplace. Transparency improves participants' ability to make choices and have enough information about how the market works to make well-informed decisions. Transparency ensures the participants are safe to reveal their information such as their willingness to pay without being worse off for disclosing. This aspect of market design is particularly important where there is a centralized process (such as an auction or clearinghouse) where both buyers and sellers must trust the operator of that process. Transparency requires that participants are informed of changes to the rules or operations of the process including, for example, modifications to algorithms within existing centralized processes."

Roth, A.E. (2007). The Art of Designing Markets. Harvard Business Review. Available at <https://hbr.org/2007/10/the-art-of-designing-market>. "They need to make it safe for those who have been brought together to reveal or act on confidential information they may hold. When a good market outcome depends on such disclosure, as it often does, the market must offer participants incentives to reveal some of what they know."

⁶⁶ Pathak Report at ¶174. "Google's secret auction manipulation programs reduced transparency for its customers. Google leveraged its ability to reduce transparency when launching programs such as Bernanke, Dynamic Revenue Sharing (including v1, v2, and tDRS), and Reserve Price Optimization ("RPO")."

⁶⁷ Milgrom Report at ¶406. "But all of the Plaintiffs' experts overlook the fact that Google had flagged to its customers as early as 2014 the possibility of an optimization like RPO that modified a publisher's floor prices on some impressions." Ad Exchange auction model" (Aug. 24, 2014), GOOG-AT-MDL-C-000035250, at -250 ("The Google DoubleClick Ad Exchange may run limited experiments designed to optimize the auction. These experiments may include modifying the standard auction model or mechanics (e.g., a tiered, rather than second price auction); simulating ad calls and auctions; modifying the min CPM set by the publisher for an impression or otherwise adjusting publisher settings; or discounting certain bids submitted by buyers or otherwise modifying the priority of the bids submitted by buyers, in an effort to optimize the auction. Publisher's buyer/advertiser blocks will not be modified.").

ambiguous disclosure do not change or undercut my opinion that RPO reduced transparency for its customers, and that publishers and advertisers would have acted differently to optimize their profit or payoff had they been made aware of RPO.⁶⁸

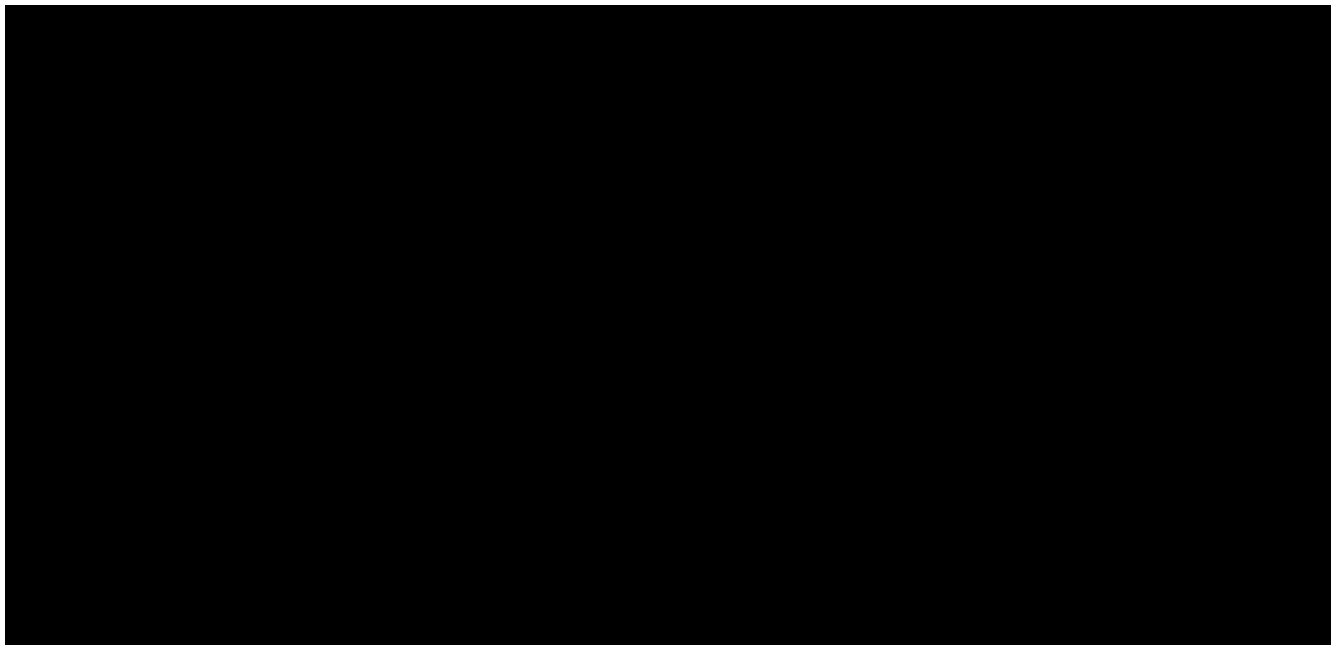
49. In an internal e-mail thread, Google [REDACTED] states that the [REDACTED]⁶⁹ Another internal Google document reflects that the timeline for the RPO launch and then the RPO announcement are a year and a half apart from one another.⁷⁰ In this brief (“RPO Brief”) dated March 2016, the history of RPO is documented as inventory based RPO launching in April 2015, with iterations launching in October 2015 and January 2016.

50. In another internal Google e-mail thread,⁷¹ when customers [REDACTED] reach out [REDACTED] Google’s team discusses, [REDACTED] [REDACTED] They also reiterate that they did not expect buyers to be aware of RPO at all, “has anyone else come across this issue? More specifically, did any of your buyers notice? If so, how did you message this, given it’s quite clear in the comms doc that we should not communicate this release externally?”⁷²

⁶⁸ Pathak Report at ¶175. “The lack of transparency of DRS, Project Bernanke, and RPO also hurt Google’s customers, since had they known the auction rules accurately, they would adjust their behavior, which would enable them to increase their revenue (for publishers) or payoff (for advertisers) by optimizing their strategies based on these programs”

“Well-designed matching process account the fact that participants are making strategic decisions. Sometimes the goal of the market designer is to reduce the need to game the system, allowing choosers to concentrate on identifying their true needs and desires. Other times the goal is to ensure that even if some gaming is inevitable, the market can still work clearly. A good marketplace makes participation safe and simple.” Roth, A.E., Who gets what and why: the new economics of match making and market design, Houghton Mifflin Harcourt, 2015, at p. 11.

⁶⁹ [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]



51. In addition, Google's response to buyers noticing programs such as RPO (and DRS) was to make them *harder* to detect. [REDACTED]

[REDACTED]

Figure 4: Email from [REDACTED] about RPO disclosure

On Fri, Mar 18, 2016 at 4:14 PM [REDACTED]@google.com> wrote:
Agree. I can't tell from the first email what caused the observations [REDACTED]
On Mar 18, 2016 4:10 PM, [REDACTED]@google.com> wrote:
[REDACTED]

2) Google's effort to conceal DRS

52. In addition, Prof. Milgrom ignores Google's efforts to conceal DRS, when knowledge of the program would have affected how advertisers bid. As I discuss in my Opening Report, had DRS v1 been transparent to advertisers, they would have changed their behavior.⁷⁴

⁷³ [REDACTED]

⁷⁴ Pathak Report at ¶188. "For DRSv1, AdX dynamically decreased its take rate to clear more impressions, while making sure that its average take rate did not go below [REDACTED]. However, Google never disclosed this conduct to advertisers or publishers who sell or buy impressions through AdX. This is partially because, in the auctions where AdX decreases its take rate, the advertisers are charged their bid, akin to a first-price auction. If the advertisers knew this was a possibility, they would shade their bids in such a situation. This would suppress the bids, reducing AdX revenue, since AdX takes a percentage of the clearing price as its fee. As a result, Google chose to not reveal DRSv1 to its customers, enabling AdX to increase its win rate⁰ without facing the repercussions of shaded bids."

53. Prof. Milgrom's claim that DRS was appropriately disclosed on Google's help page⁷⁵ is belied by Google's attempt to conceal DRS. For instance, DRS was not announced as a program until 2016 with DRS v2, and internal communication documents stated that Google [REDACTED] [REDACTED] Furthermore, the disclosure contained insufficient information about the details of DRS, and had advertisers known the full extent of DRS, they would have adjusted their bids.⁷⁷

54. Prof. Milgrom agrees that bidders would be incentivized to reduce their bids under DRS.⁷⁸ However, there was no outreach to buyers after the launch of DRS v1 and DRS v2, which would alert them to shade their bids.⁷⁹ [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

"Well-designed matching process account the fact that participants are making strategic decisions. Sometimes the goal of the market designer is to reduce the need to game the system, allowing choosers to concentrate on identifying their true needs and desires. Other times the goal is to ensure that even if some gaming is inevitable, the market can still work clearly. A good marketplace makes participation safe and simple." Roth, A.E., *Who gets what and why: the new economics of match making and market design*, Houghton Mifflin Harcourt, 2015, at p. 11.

⁷⁵ Milgrom Report at ¶468. "These claims of deception are contradicted by disclosures in the AdX Help Center starting from at least August 2015—before the launch of DRS v1. It says, "DoubleClick Ad Exchange determines the winning bidder based on the highest net bid submitted. Note that the net bid reflects any adjustments Ad Exchange may, at its discretion, have made to the bid submitted by the buyer for the purpose of optimizing the auction."

⁷⁶ [REDACTED]

⁷⁷ Publishers reached out to Google to understand how DRS worked, including "what is my contracted revenue share", "why would it be in my advantage to have this fluctuate?", "how can I see the effect if I were to go along with this?", and "why is this so complex." GOOG-DOJ-14156657 at 658.

Pathak Report at ¶188. "This is partially because, in the auctions where AdX decreases its take rate, the advertisers are charged their bid, akin to a first-price auction. If the advertisers knew this was a possibility, they would shade their bids in such a situation."

Vickrey, W. (1961). Counterspeculation, Auctions, and Competitive Sealed Tenders. *The Journal of Finance*, 16(1), 8–37. Available at <https://doi.org/10.2307/2977633>.

⁷⁸ Milgrom Report at ¶431. "Under DRS v1, bidders were incentivized to reduce their bids for impressions."

⁷⁹ [REDACTED]

⁸⁰ [REDACTED]

3) **Google's effort to conceal Bernanke**

55. As I explain in my Opening Report, Bernanke distorted match quality by placing bids in the second-price AdX that were different from the advertiser's true valuation.⁸² Bernanke is a deviation from what is expected in a second-price auction, because the winner of the auction might not have the highest valuation.⁸³

56. Prof. Milgrom has not addressed the match quality inefficiencies created by the secrecy of Bernanke's bidding process. He claims that "with or without a program like Bernanke, it would still be possible for low-quality ads to win with a sufficiently high bid."⁸⁴ However, he does not consider how Bernanke distorts advertisers' valuations and fails to signal to publishers every time it runs. Google does not alert advertisers when it could have won with a lower bid, and does not alert publishers when a lower-bid advertiser wins over a higher-bid advertiser.⁸⁵

57. In addition, Prof. Milgrom does not address how publishers and advertisers would have changed their behavior had they known about Bernanke. As I discuss in my Opening Report,

⁸¹

⁸² Pathak Report at ¶56. "As I explain in Section XII, Google's conduct has distorted information available to advertisers and publishers, affecting their decision-making. For example, Project Bernanke and related programs provide a mechanism that is opaque to the outside market and difficult to detect. Bernanke effectively increased GDN's top bid into AdX beyond the advertiser's willingness to pay for some auctions. If advertisers were aware of Project Bernanke, they could optimize their bidding strategies accordingly. Without this information, since the auction was distorted, advertisers willing to pay more for the impression could be left out, resulting in an allocation that does not satisfy the fundamental concept of fairness."

⁸³ Pathak Report at ¶68. Under a first-price auction, the item is awarded to the bidder who submitted the highest bid with the winner paying their bid (i.e., the highest submitted bid) for the item. Under a second-price auction, the item is awarded to the bidder who submitted the highest bid, just like the first-price auction procedure. But with second-price auctions, the winner pays the second-highest submitted bid for the item. This change in payment rule is the main distinction between the first- and second-price auction procedures. Vickrey (1961), Myerson (1981), Riley and Samuelson (1981), and Milgrom and Weber (1982) provide analyses and comparison of first- and second-price auctions under different assumptions about bidder valuations and behavior.

⁸⁴ Milgrom Report at ¶166.

⁸⁵

if Google Ads announced the conduct to the public, (a) the advertisers would shade their bids, and (b) publishers would increase their reserve prices to take advantage of the inflated top bids.⁸⁶

58. Prof. Milgrom states, “Bernanke, as a Google Ads bidding program, did not change anything about the level of transparency on AdX, a supply-side tool [and that] publishers are not entitled to bidders’ private biddings strategies, and indeed revealing them could be harmful to bidders’ outcomes.”⁸⁷ However, his contention is at odds with the stated goals of Bernanke. The Bernanke optimization is about increasing fill rate and total revenue for publishers and all AdX publishers were affected by the change.⁸⁸

59. Bernanke was ostensibly a publisher revenue optimization program, but concealment from publishers was at the center. Internal documents around Bernanke communications include titles such as [REDACTED]

60. Prof. Milgrom also states that Plaintiffs’ experts have only provided anecdotal evidence about the effects of Bernanke.⁹⁰ However, documents and testimony from Google engineers demonstrate that Bernanke led to [REDACTED]

⁸⁶ Pathak Report at ¶183. See Krishna, V. (2010). Auction Theory. Academic Press. Chapter 2 for a more detailed discussion. Available at <https://doi.org/10.1016/B978-0-12-374507-1.00015-7>

⁸⁷ Milgrom Report ¶174. He also argues that “determining bids in auctions are routinely kept secret to prevent other auction participants from gaming these strategic choices.” Milgrom Report at ¶32.

⁸⁸

⁸⁹

⁹⁰ Report of Paul Milgrom at 166. “It is not clear from that evidence alone how prevalent low-quality ads were and whether changes to Bernanke would affect their prevalence. Moreover, preventing the display of objectionable ads is primarily a filtering challenge rather than a problem associated with any single auction program.”

⁹¹

Highly Confidential

On Thu, Jan 12, 2017 at 2:04 PM, [REDACTED]@google.com> wrote:
[REDACTED] for FYI

Best,
[REDACTED]

61. Google research scientist [REDACTED] pointed to Bernanke as causing the behavior and stated that Bernanke encourages [REDACTED]

On Tue, Jan 17, 2017 at 8:38 AM, [REDACTED]@google.com> wrote:

62. Internal Google documents also reveal that Google kept a list of [REDACTED]
[REDACTED] An email from 2015 states that after the launch of Global Bernanke, [REDACTED]
[REDACTED]

On Fri, Feb 13, 2015 at 11:48 AM, [REDACTED]@google.com> wrote:
Hi All,

[REDACTED]

Thanks,

[REDACTED]

63. Google's internal commitment to maintaining secrecy of the operations of RPO, DRS, and Bernanke and selective and exclusively verbal disclosure of RPO and DRS undermine Profs. Milgrom's and Ghose's arguments that publishers and advertisers were provided sufficient disclosure about these programs.⁹⁴

E. Profs. Milgrom and Ghose ignore the reasons why publishers want to set differentiated floors and had issues with UPR

64. In explaining Google's move to the first-price auction, both Profs. Milgrom and Ghose fail to explain that Google used the move to the new auction format to implement Unified Pricing Rules ("UPR") and "unwind high AdX price floors."⁹⁵ The goal of UPR was to override publisher choice of where to send their inventory.

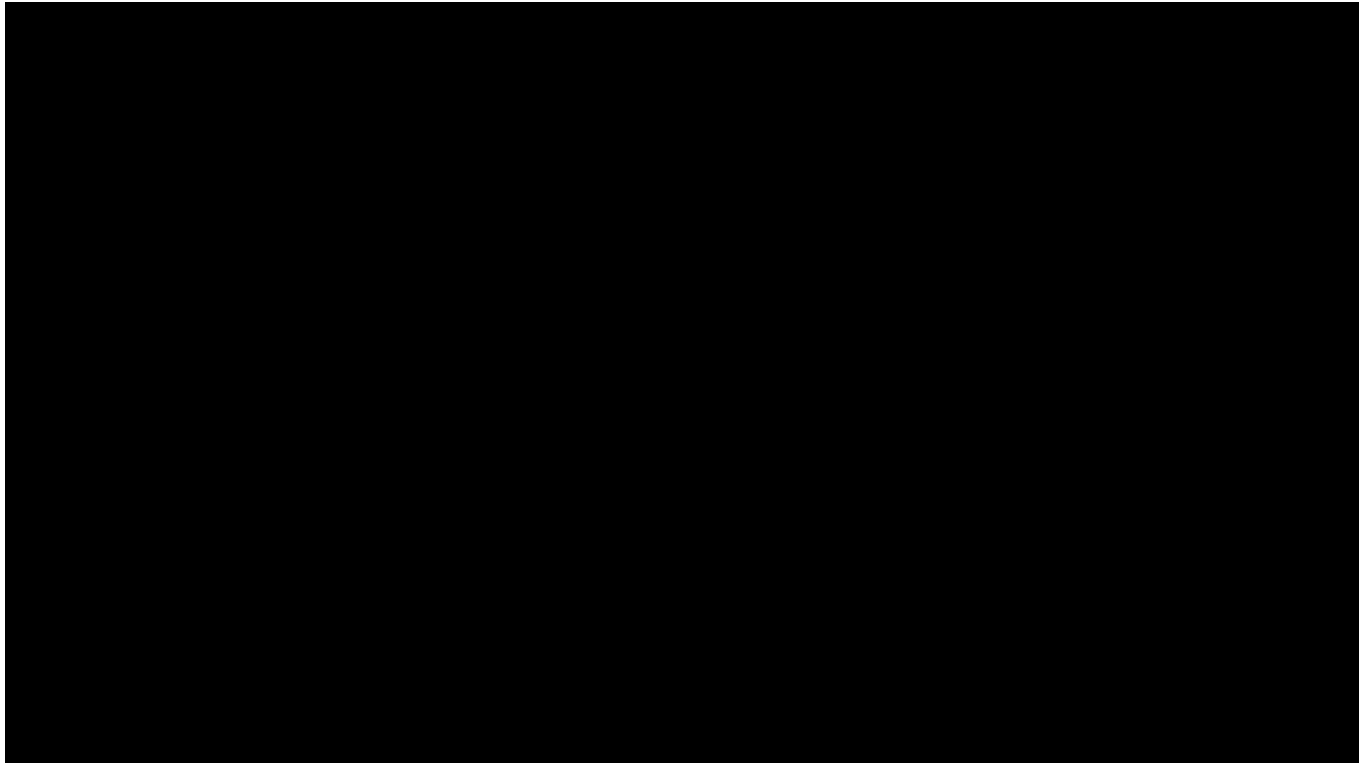
⁹⁴ [REDACTED]

[REDACTED]

65. Prof. Milgrom also ignores why publishers want to set differentiated price floors.⁹⁶ Response to program or quality-protection is one reason, for example. One email from Google Research Scientist [REDACTED]

[REDACTED] [REDACTED]
[REDACTED]

Figure 5: Move to the First-Price Auction and UPR⁹⁸



66. Prof. Milgrom also states to control quality that there are “more direct tools than exchange-discriminatory floor prices.”⁹⁹ However, this ignores that publishers were not able to control for quality in the face of conducts such as Bernanke, as I detailed in Section IV.D.3. In addition, Prof. Milgrom’s argument ignores that other publishers may want to set differentiated floors, as shown in Figure 5.

⁹⁶ Milgrom Report at ¶548. “And Plaintiffs fail to account for the more obvious reasons that optimal floor prices were higher for AdX before the transition to the UFPA. With earlier ad allocation processes, bids from different exchanges were evaluated sequentially (as in waterfall and Dynamic Allocation) and, often, AdX was running a second-price auction alongside Header Bidding’s first-price auctions (as in Open Bidding). In such cases, it was optimal for publishers to set different floor prices for different exchanges, as I explain below.”

⁹⁷ [REDACTED]
[REDACTED]

⁹⁹ Milgrom Report at ¶555.

67. In addition, Prof. Milgrom states that the motivation for UPR was to protect advertisers from “price-fishing.”¹⁰⁰ I explain further in Section V.E why Prof. Milgrom’s justification of “price-fishing” is pretextual and not supported by the record.

68. In addition, Prof. Milgrom provides a “solution” to publishers who want to preference other exchanges: post-auction discounts. Prof. Milgrom, however, does not provide evidence on the viability of, and how often publishers use, post-auction discounts. Sources indicate that post-auction discounts are not common. For instance, Ad Exchanger described a post-auction discount deal between Index Exchange and Group M, as an “unusual partnership,” where Group M would spend more on Index Exchange in exchange for better rates with publishers.¹⁰¹

69. While post-auction discounts may exist, they are more complicated and frictional for publishers compared to differentiated price floors. Instead of changing price floors, which publishers may wish to do often, a post-auction discount involves increased negotiation with exchanges or buyers on discounts.¹⁰² Controlling floors in the ad server allows publishers to be nimbler than a post-auction discount – in the ad server, publishers can set floors as they wish. As *AdExplain* reported in 2020, many publishers do not like post-auction discounts, “which take away some of their control over the auction and make real-time yield analysis more challenging.”¹⁰³

V. PROFS. MILGROM’S AND BAYE’S ARGUMENTS THAT GOOGLE NEEDS “TO BALANCE THE INTEREST OF ADVERTISERS AND PUBLISHERS” ARE PRETEXTUAL AND DO NOT CHANGE MY OPINION THAT GOOGLE ACTS ON CONFLICTS OF INTEREST

¹⁰⁰ Milgrom Report at ¶1521, “UPR benefited Google’s buyer-customers. Although Google’s Open Bidding had addressed some of the flaws of header bidding (as described in Section XIII), advertisers still faced the risk of self-competition, in which an advertiser partners with multiple DSPs or bids into multiple exchanges when those are competing for the same impression. In turn, publishers could exploit this advertiser multi-homing through a tactic known as price-fishing.”

¹⁰¹ GroupM Partners With Index Exchange As Hold Cos Lean Into SSPs” *AdExchanger*, March 2, 2020. Available at <https://www.adexchanger.com/agencies/groupm-partners-with-index-exchange-as-hold-cos-lean-into-ssps/>

¹⁰² Negotiation is the expected result of signing a deal together. “GroupM and Index are expected to sign a formal, non-exclusive partnership in the first weeks of March around these goals.” GroupM Partners With Index Exchange As Hold Cos Lean Into SSPs” *AdExchanger*, March 2, 2020. Available at <https://www.adexchanger.com/agencies/groupm-partners-with-index-exchange-as-hold-cos-lean-into-ssps/>

¹⁰³ “While most large publishers are fine with volume and fee-based discounts because they end up receiving more valuable bids overall, many don’t like post-auction discounts, which take away some of their control over the auction and make real-time yield analysis more challenging.” “GroupM Partners With Index Exchange As Hold Cos Lean Into SSPs” *AdExchanger*, March 2, 2020.

A. Google's ownership of the publisher ad server, exchange, and ad buying tools creates an inherent conflict of interest

70. As discussed above, publisher ad servers, ad exchanges, and ad buying tools should serve the interests of their customers.¹⁰⁴ However, instead of serving the interests of customers, Google uses its ownership of the publisher ad server, ad exchange, and ad buying tools to act on an inherent conflict of interest.¹⁰⁵

71. Prof. Milgrom incorrectly dismisses how Google creates and capitalizes on conflicts of interest. He states that "it is true that buyers and sellers have conflicting interests regarding prices, [b]ut Google's business model balances those conflicting interests in a disciplined way that jointly benefits all participants on the platform."¹⁰⁶

72. However, Prof. Milgrom ignores two relevant facts when considering conflicts of interest. First, publishers and advertisers are not customers of a single Google platform. Advertisers are not customers of publisher ad servers, and publishers are not customers of ad buying tools. Advertisers sign contracts for ad buying tools and publishers sign contracts for publisher ad servers.¹⁰⁷ Second, Google uses its tools and business model to place constraints on publishers and advertisers that would not otherwise exist to advance Google's interests.¹⁰⁸

¹⁰⁴ Stigler, George J. "The economics of information." *Journal of Political Economy*, vol. 69, no. 3, 1961, pg. 213-225. Becker, Gary S. "Irrational behavior and economic theory." *Journal of Political Economy*, vol. 70, no. 1, 1962, pg. 1-13. See also Hirschman, Albert O., *Exit, Voice, and Loyalty*. (1970).

¹⁰⁵ Pathak Report at ¶17, "Buyers and sellers in marketplaces have opposing interests. A buyer wishes to pay less for an impression, while a seller wants to receive more. The marketplace operator wishes to maximize trading volume and steer traffic to its exchange over competing alternatives. Because Google is involved with all three entities, it has an inherent conflict of interest. Maximizing the interests of one type of participant may harm the interests of another type of participant. Google's conduct in the Ad Tech Stack results from conflicts of interest due to being involved in all sides of digital advertising transactions."

Pathak Report at ¶59 "Creating straightforward incentives is a fundamental objective in market design. Market designers aim to set up markets such that participants cannot improve their outcome by attempts at strategic manipulation or gaming the system, such as stating preferences other than their true preferences or bidding differently from their true values. Rather, market designers aim to design systems that incentivize participants to reveal their true preferences in matching marketplaces and bid their true valuations in auctions."

Pathak, P. A. What Really Matters in Designing School Choice Mechanisms. Chapter 6 in *Advances in Economics and Econometrics: Eleventh World Congress*, edited by Bo Honoré, Ariel Pakes, Monika Piazzesi, and Larry Samuelson, 176-214. Econometric Society Monographs. Cambridge: Cambridge University Press, 2017

¹⁰⁶ Milgrom Report at ¶24

¹⁰⁷ ORDER FORM – DFP Premium and AdX Services - GOOG-AT-MDL-019642313 (executed); GOOG-TEX-00978814 (executed Google Ad Manager 360 Service agreement - GOOG-AT-MDL-013473046 (executed)

¹⁰⁸ Pathak Opening Report, Section IX "Google tied its ad exchange to its ad server, against the interest of its customers." Pathak Opening Report Section XI "Google's Control over Publisher Inventory, Arising from the Tie, Enabled Google to Consistently Act Against the Interests of its Publisher Customers." Pathak Opening Section XI, "Google Took Away Choice from Publishers to Benefit its Exchange and Advertiser Tools."

73. As I discuss in my Opening Report, Google's ownership of the publisher ad server, ad exchange, and ad buying tools is an inherent a conflict of interest.¹⁰⁹ Google's publisher ad server has an incentive to steer impressions toward Google's exchange rather than to exchanges that can maximize publisher revenue through better matches.¹¹⁰ Google's ad buying tools have an incentive to steer impressions toward Google's exchange, rather than to exchanges that can maximize advertiser ROI through better matches.¹¹¹

74. Google's conduct does not balance the interests of publishers and advertisers. Instead, it uses cross-market programs to restrict choice of publishers and advertisers.¹¹² As I will discuss in the next section, Profs. Milgrom and Baye provide pretextual justifications for Google's conduct, in the name of "balancing the interests of publishers and advertisers." Additionally, most of the "problems" that Google's experts claim are solved by Google's conduct are not problems, but are also pretextual in nature. For example, with UPR, price-fishing is rarely, if ever, raised as a reason for Google's conduct (UPR). Furthermore, as I will demonstrate, these alleged problems are either the result of Google's conduct, or could be solved by the marketplace without Google's restrictions on market participants.

B. Sell-side conduct: Google's Tying

¹⁰⁹ Pathak Report at ¶134.

¹¹⁰ "What is the primary objective of the Sellside Business?"

The primary purpose of the Sellside business currently

¹¹¹ Pathak Report at ¶96. "Google acts on its conflicts of interest by taking actions that are contrary to the principles of market design I outlined above which give rise to well-functioning marketplaces. Google reduces marketplace efficiency by acting contrary to these principles of market design. publishers and advertisers to use multiple exchanges to obtain the most relevant matches and maximize gains from trade which leads to marketplace efficiency. In contrast, Google has an incentive to steer publishers and advertisers towards trading on its AdX exchange alone."

¹¹² "

75. As I discussed in Section IV.A Profs. Milgrom and Ghose do not address the DFP-AdX tie or my analysis of the tie.

76. Prof. Milgrom states that Google has to account for externalities on both the sell and buy side.¹¹³ Prof. Milgrom mischaracterizes my Opening Report analysis by stating that I ignore that other firms launched similar conduct to Google's challenged conduct.¹¹⁴ However, my opinion is not that vertical integration is a requirement for the programs, but that Google's conduct was motivated by conflicts of interest that comes from control of the publisher ad server, exchange, and ad buying tools.¹¹⁵ In addition, the tie makes Google's conduct more effective than they were for other firms.¹¹⁶

77. Prof. Baye states that as an integrated platform, Google has a "stronger economic incentive to balance the interest of advertisers, publishers, and users"¹¹⁷ and that the "integration of the ad tech stack is not an anticompetitive tie."¹¹⁸

78. However, Prof. Baye ignores that integrations between tools does not mean or require exclusivity, as is the case with DFP and AdX. For instance, DV360 can interoperate with non-AdX exchanges, and non-AdX exchanges can interoperate with DFP.¹¹⁹ If Google were to remove the tie, DFP publishers would still be able to access AdX *and* publishers would have more choice as to which ad server they want to use to manage their inventory. Choice matters for publishers, because they can choose an ad server that best suit their needs (e.g. white-glove

¹¹³ Milgrom Report at ¶23. "Unlike an intermediary representing just one side of an industry, platforms like Google are incentivized to account for *externalities* that occur among participants on the platform. For example, where an intermediary representing sellers alone might be incentivized to engage in multi-calling (in which a publisher calls the same bidders multiple times to bid for an impression, possibly with different floor prices, harming both advertisers and other publishers and undermining the auction design), a platform representing *both* publishers and advertisers would account for the harms of such behavior on advertisers and would disincentivize that behavior."

¹¹⁴ Milgrom Report at ¶23. Professor Pathak contends that various elements of Google's challenged conduct would not have arisen but for Google's integrated business model. But those claims overlook the fact that, for all of the programs that Plaintiffs and their experts claim to be anticompetitive, there are less integrated display advertising intermediaries with the same or similar features"

¹¹⁵ Pathak Report at ¶17.

¹¹⁶ For instance, Prof. Milgrom claims that [REDACTED] had a similar programs to Bernanke. [REDACTED]

¹¹⁷ Baye Report at ¶161

¹¹⁸ Expert Report of Michael Baye Report Section X.C.1

¹¹⁹ Google's Open Bidding is an example of non-AdX exchanges interoperating with DFP. DFP allows non-AdX exchanges to provide real-time bids. "Open Bidding allows you to invite third-party demand partners to compete for your inventory in a single auction with real-time, server-to-server bidding. Open Bidding in Ad Manager also provides simplified trafficking, reporting, and billing." "Introduction to Open Bidding," Google Ad Manager Help. Available at <https://support.google.com/admanager/answer/7128453?hl=en>. Accessed September 8, 2024.

service)¹²⁰ and helps them to maximize their revenue. If AdX was not tied to DFP, it would also have an incentive to connect to more publisher ad servers to maximize the number of transactions it intermediates.

79. Prof. Baye contends that an integrated firm has “enhanced incentives to make specific investments to improve interoperability of its products as compared with a non-integrated firm”¹²¹ and states that Google’s investments “resulted in ad tech that is often considered best-in-class and have improved quality by increasing click-through rates, improving safety features, and decreasing spam.”¹²² However, Prof. Baye ignores that other exchanges made similar investments without conditioning access to their exchanges on the use of their ad servers.¹²³ Any exchange trying to attract publisher or advertiser customers has an incentive to make good matches, improve safety features, and decrease spam.¹²⁴ The forces of competition will deliver these goals, and an optimal market design should not be left to a control of a single firm.¹²⁵

80. Furthermore, as I discussed in my Opening Report, an exchange has an incentive to maximize the number of publishers on its platform to increase the likelihood of a match for its advertisers.¹²⁶ In fact, Prof. Baye contradicts evidence that shows that Google *did* have the ability to provide real-time bids to third party ad servers, and that by doing so, Google would have expanded their AdX customer base.¹²⁷ As I discuss in my Opening Report, Google could have

¹²⁰ [REDACTED]

¹²¹ Baye Report at ¶74

¹²² Baye Report at ¶74

¹²³ For instance, the Picalate Global Seller Trust Index ranks SSPs across mobile and web. Exchanges such as Index Exchange, Sovrn, Freestar rank above Google (ranked 8) on Picalate’s ranking. “Seller Trust Index; Top Website SSPs,” Picalate, North America, Q1 2024. Available at <https://ratings.picalate.com/rankings/domain/seller-trust-index/NA/20240301>. Picalate measures quality using Ad Density, Ads.txt, Brand Safety, Invalid Traffic (IVT), Permissions, Programmatic Reach, User Engagement, and Viewability. “Publisher Trust Index: Methodology,” Picalate, available at <https://www.picalate.com/publisher-trust-index-methodology>

¹²⁴ Consider, if spam ads continued to win on an exchange, the publisher would stop sending impressions to that exchange. Bad quality leads to switching. Stigler, George J. “The economics of information.” *Journal of Political Economy*, vol. 69, no. 3, 1961, pg. 213-225

¹²⁵ Steven C. Salop, Invigorating Vertical Merger Enforcement, 127 Yale L.J. 1962-1994 (2018)

¹²⁶ Pathak Report at ¶92. “If Google were an independent exchange, it would compete on price and the number of buyers and sellers it can attract.”

“[Marketplaces] need to provide thickness—that is, to bring together a large enough proportion of potential buyers and sellers to produce satisfactory outcomes for both sides of a transaction.”

Roth, A.E. (2007). The Art of Designing Markets. Harvard Business Review. Available at <https://hbr.org/2007/10/the-art-of-designing-markets>.

¹²⁷ [REDACTED]

provided “Third-Party Dynamic Allocation” to increase “inventory that [they] did not feel we could get on [their] own.”¹²⁸

81. Prof. Baye provides no evidence that the contractual tie was required to ensure interoperability between Google’s exchange (AdX) and ad server (DFP). And he has not provided evidence that the tie brought increases in quality investments beyond what an independent exchange would do. Had there been no tie, Google’s ad server would have an incentive to compete to attract publishers. Google’s exchange would have an incentive to compete to attract publishers, and maximize the number of publisher customers to increase the likelihood of a quality match.¹²⁹

C. Sell-side conduct: DA/EDA

82. As I discussed in Section IV.B when discussing Dynamic Allocation, Profs. Milgrom and Baye use the incorrect counterfactual. They only consider Dynamic Allocation an improvement over the waterfall, but do not consider the counterfactual had Google participated in Header Bidding or otherwise allowed AdX to provide real-time bids to other exchanges. As I also explain above, Profs. Milgrom and Baye do not consider the industry reaction to Dynamic Allocation, which was to create Header Bidding, as I detail in Section IV.C.

83. The fact that the industry created a new innovation, Header Bidding, in response to Google’s conduct illustrates that competitive forces, and not a single firm, are best positioned to advance the interests of market participants.¹³⁰

¹²⁸ Pathak Report at ¶129; “Improve is a niche player in the region and does not run on DFP as they have their own custom ad server. They also have inventory that we did not feel we could get at on our own due to their relationships and greater presence in the region.” [REDACTED]

¹²⁹ Stigler, George J. “The economics of information.” *Journal of Political Economy*, vol. 69, no. 3, 1961, pg. 213-225

¹³⁰ Based on economic welfare theorems; See David M. Kreps, 2012. “Microeconomic Foundations I: Choice and Competitive Markets,” Economics Books, Princeton University Press, edition 1, volume 1, number 9890.

Pathak Report at ¶144. “Header Bidding was attractive to publishers because publishers could increase their yield with simultaneous bidding from multiple exchanges. Google stated that AdX does not have the same demand from advertisers as other exchanges, thus there is a benefit for publishers to introduce new exchanges. In addition, Google recognized that Header Bidding allows all exchanges to compete at every price point in real time, which maximizes yield for publishers.” [REDACTED]

84. In addition, Profs. Milgrom and Baye do not consider how a better alternative would be to allow publishers to choose which exchange is given Dynamic Allocation.¹³¹ Prof. Milgrom's argument that Dynamic Allocation increased revenue for publishers over the waterfall system would still hold true if AdX were replaced by another exchange.

85. Prof. Milgrom also states that publishers have no incentive to "opt out" of programs such as EDA.¹³² This ignore Google evidence that publishers wanted more control over their inventory and provided feedback that they would like EDA to be optional.¹³³

D. Sell-side conduct: Header Bidding

86. Profs. Milgrom and Baye ignore the consequences of Google not participating in Header Bidding. Issues such as line item limitations and Last Look are consequences of Google not participating in Header Bidding, or an independent, unified auction. As explained below, had AdX participated in Header Bidding, Last Look and line item limitations would become moot. Publishers would not be forced to choose between "inflating" value CPMs or underpricing a line item to have AdX steal impressions. In addition, publishers could reduce costs on line item setups, as they would not require extensive granular setups had Google participated in Header Bidding.

1) Line Item Limitations

87. Prof. Baye and Milgrom both state that line-item limits are driven by technical limitations and that too many line items would create negative externalities.¹³⁴

¹³¹ Then customers could choose the exchange that best meets their needs. Stigler, George J. "The economics of information." *Journal of Political Economy*, vol. 69, no. 3, 1961, pg. 213-225

¹³² Milgrom Report at ¶1351. "Professor Pathak claims that "Google reduced publisher choice when it restricted publishers' ability to opt out of Enhanced Dynamic Allocation" and that "EDA diminished publishers' control [...] for their high-value inventory." But, as I have shown, EDA maximizes publisher revenues, while having no economically significant effect on the quality of impressions allocated to guaranteed contracts. Because EDA increased ad server functionality by unifying the competition between guaranteed and remnant demand, publishers had no incentive to "opt out."

¹³³

¹³⁴ Baye Report at ¶1560 "[Prof. Gans] ignores evidence in the record indicating that firms that abuse the number of line items can inflict negative externalities on other publishers and that Google has a legitimate, procompetitive business interest in preventing those negative externalities."; Milgrom Report at ¶1355 "Google had legitimate technical reasons to protect its systems from the strain caused by publisher configurations with unusually many line items."

88. However, Prof. Baye and Milgrom ignore the primary reason Google chose not to grant line item extensions: the benefit those extensions would provide [REDACTED]

89. In addition, Prof. Milgrom's contention that only a few publishers wanted increased line items is at odds with how Google [REDACTED]

90. When discussing negative externalities, Prof. Baye and Milgrom ignore another way Google could have managed the externalities of increased line items: charging publishers for increased usage. Prof. Baye states that "specifically, Google noted that every incremental 60,000 line items is associated with a 1- to 2-percent increase infrastructure costs."¹³⁸ As Google can price the externality of increased line items, it would be able to charge publishers for increased usage. There are many examples of charging for extra usage; for instance, the cloud document system Box has different price points for upload limits and API calls.¹³⁹

91. If line items did create externalities for Google, then it would be able to pass the externality to the publisher via a price. Then the publisher could weigh the benefits of increased line items versus increased costs. But Google did not offer publishers this option, although they

¹³⁵ [REDACTED].

¹³⁶ Pathak Report at ¶149, [REDACTED]

¹³⁷ Additional publishers requesting line items limits include: [REDACTED]

¹³⁸ Baye Report at ¶564, [REDACTED]

¹³⁹ "Choose the Best Plan for your business" Box. Available at <https://www.box.com/pricing>, accessed September 8, 2024

did consider charging, publishers, which recognizes they could have internalized the externality.¹⁴⁰

2) Last Look

92. Prof. Milgrom also states that “Last Look” was not a program, but a result of how publishers set up their line items.¹⁴¹ If publishers were sufficiently large, they could create thousands of line items to represent real bids from header bidding.¹⁴² If a publisher could not manage thousands of line items, then a publisher would have to set a value CPM for Header Bidding line items that AdX could still beat through Dynamic Allocation.¹⁴³

93. Prof. Milgrom states that publishers could use line items to “inflate” header bids, by setting value CPMs higher than the real-time header bid.¹⁴⁴ Prof. Milgrom continues and states that “by setting floor prices in this manner, a bidder on AdX would need to bid more than a penny above the highest bid from a header bidding exchange in order to win the impression.”¹⁴⁵ However, Prof. Milgrom ignores the second scenario: Header Bidding bids could be higher than AdX and still lose to AdX if the value CPM were lower than the Header Bidding bid, which is

¹⁴⁰ [REDACTED]

¹⁴¹ Milgrom Report at ¶1359 “The so-called “last look” was not a Google program: it arose as a consequence of the way that publishers configured header bidding using the line item capabilities that publisher ad servers (including DFP) supported at the time header bidding was introduced.”

¹⁴² The [REDACTED] is an example of a large publisher who created thousands of line items for Header Bidding. [REDACTED]

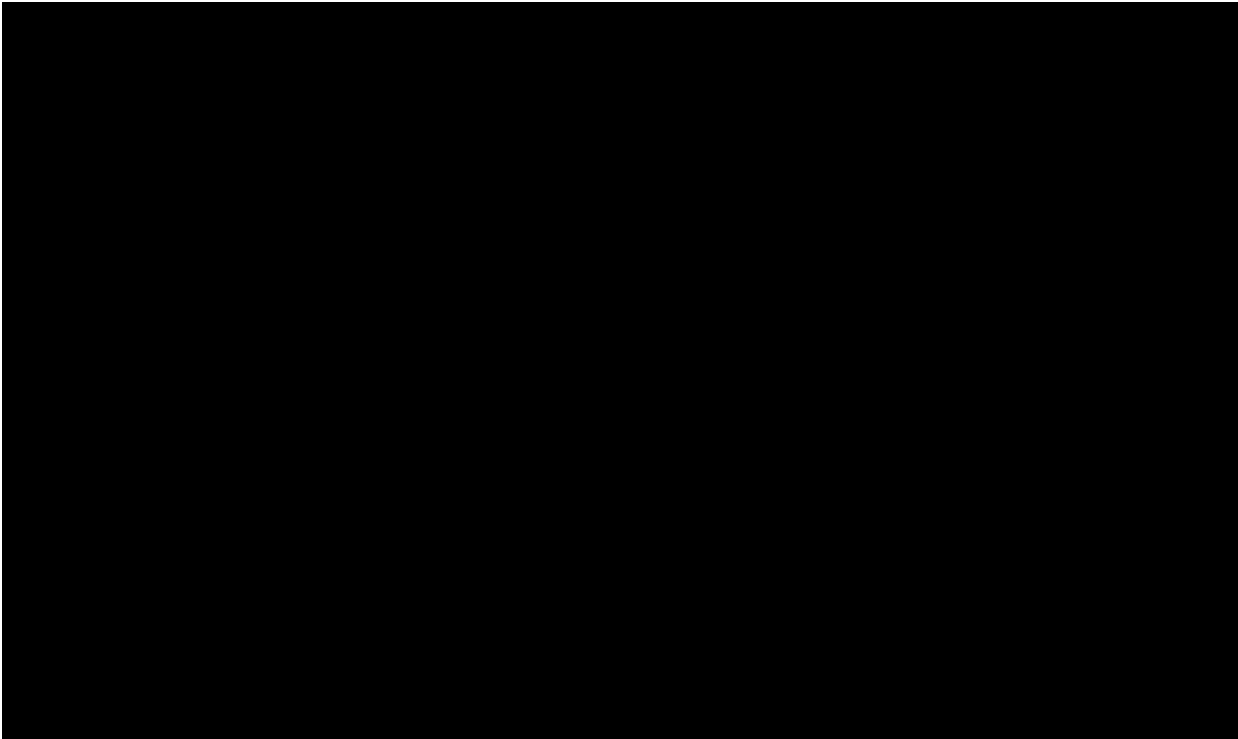
¹⁴³ [REDACTED] Google, “Value CPM,” Google Ad Manager (accessed Oct. 15, 2023), <https://support.google.com/admanager/answer/177222?hl=en> (“The value CPM (cost per thousand impressions) is an amount you specify to help Google Ad Manager estimate the value of campaigns. The amount entered in the ‘Value CPM’ field serves two purposes: 1. It’s used in revenue calculations for impressions served. 2. When a value CPM is defined for remnant line items, the value CPM is used for competition in dynamic allocation and First Look instead of the ‘Rate’ value.”).

¹⁴⁴ Milgrom Report at ¶1357. “The actual header bids are never observed by GAM or bidders on AdX. GAM would use the value CPM of the header bidding line item in its ad selection process (including DA and EDA). As a result, the highest bid from an AdX bidder would win the impression only if it exceeded the highest value CPM associated with header bidding line items and any other floor prices that might apply to the impression. If there was no such higher AdX bid and the header bidding line item had the highest value CPM among all the other line items, the impression would be allocated to the winning header bidder.”

¹⁴⁵ Milgrom Report at ¶1358.

inefficient.¹⁴⁶ Google recognized that [REDACTED]

[REDACTED]



94. Had AdX participate in Header Bidding, then Last Look would have been a moot point. Exchanges would compete on equal footing in a single auction.

95. In addition, as I discussed in my Opening Report, Minimum Bid to Win (MBTW), helps recreate Last Look, because Google continues to not participate in Header Bidding.¹⁴⁸ Prof. Milgrom argues that MBTW to win is not a recreation of Last Look because there are technical

¹⁴⁶ [REDACTED]

¹⁴⁸ Pathak Report at ¶199. [REDACTED]

limitations of providing [REDACTED] to Header Bidding exchanges.¹⁴⁹ However, it is my understanding that Google uses [REDACTED] data for bids in its next auctions, demonstrating the importance of the data for bidding.¹⁵⁰ In addition, as with Last Look, at Google participated in Header Bidding, there would be no technical limitation.

E. Sell-side conduct: UPR

96. Profs. Milgrom and Baye justify UPR as protecting “advertisers from price-fishing.”¹⁵¹ This justification is pretextual because there is no evidence that price-fishing or self-competition is a widespread issue facing advertisers. In addition, even if price-fishing were widespread, it would not be a problem for a *publisher* ad server to solve.¹⁵²

97. First, Prof. Milgrom and Baye have not provided evidence that Google’s UPR strategy was based on a price-fishing concern. In my review of the record, I have found minimal evidence of “price-fishing” as a widespread concern among Google’s employees.¹⁵³ In addition, I have not found any official UPR strategy documents supporting price-fishing as a justification for implementing the program.

¹⁴⁹ Milgrom Report at ¶503. “Plaintiffs allege that Google and Open Bidding exchanges could use MBTW data “to adjust their future bidding strategy to continue trading ahead of exchanges returning bids through header bidding and underpaying for publishers’ impressions” and that this data allowed Google to “recapture the advantages it had under Last Look.”

Milgrom Report at ¶506. “However, this argument overlooks the technological limitations of “sharing” MBTW data with header bidding exchanges, ignores the alternative methods available for header bidding buyers to obtain this data, and overstates the unique importance of MBTW data.”

¹⁵⁰ [REDACTED]

¹⁵¹ Milgrom Report at ¶521. “In turn, publishers could exploit this advertiser multi-homing through a tactic known as price-fishing: by setting different floor prices for different exchanges, a publisher could increase its revenue at the expense of such advertisers. Internal documents suggest Google was concerned about the possibility of price-fishing after the transition to the UFPA, and UPR protected advertisers from such tactics.”

Baye Report at ¶89. “Professor Gans fails to take into account the effect of UPR on advertisers as well as publishers. UPR benefited advertisers because it prevented opportunistic publishers from squeezing surplus from advertisers by setting different price floors for different exchanges to fish for the highest price. This fishing behavior created a situation in which advertisers could unknowingly bid against themselves multiple times—and ultimately overpay—for an impression. UPR mitigated the effects of multi-calling and reduced self-competition, benefiting advertisers.”

¹⁵² [REDACTED]

If the ad server impeded the ability for publishers to maximize yield, they publishers would want to switch. Becker, Gary S. “Irrational behavior and economic theory.” *Journal of Political Economy*, vol. 70, no. 1, 1962, pg. 1-13. See also Hirschman, Albert O.. *Exit, Voice, and Loyalty*. (1970).

¹⁵³ For instance, my simple keyword search of “price fish*” “price-fish*” and “UPR” of documents in the record yields 8 results out of 7 million+ total documents. 6 of the results are expert reports that have been produced for this matter, and no results are strategy documents.

98. In addition, there is no indication in the record that advertisers have a risk of self-competition, as Prof. Milgrom asserts.¹⁵⁴ One analysis of self-competition found that self-competition for advertisers was minimal, ranging from [REDACTED] of impressions.¹⁵⁵

99. Second, any self-competition (if any) was a result of Google not participating in Header Bidding. Google's internal documents also [REDACTED]

[REDACTED]

100. Third, Prof. Milgrom asserts that advertisers in first price auctions "can reverse some of the losses to multi-calling, making it less likely for that tactic to be profitable."¹⁵⁷ As UPR was launched in tandem with the move to the first-price auction, advertisers would be able to manage any self-competition concerns.

101. Profs. Milgrom and Baye do not provide compelling evidence that self-competition or price-fishing is a widespread concern for advertisers. In addition, if the problem were real, leveraging the publisher ad server is an inappropriate solution, because a publisher ad server has no incentive to keep prices low for advertisers, instead a publisher ad server looks for the best price for publishers.¹⁵⁸

¹⁵⁴ Milgrom Report at ¶521, "UPR benefited Google's buyer-customers. Although Google's Open Bidding had addressed some of the flaws of header bidding (as described in Section XIII), advertisers still faced the risk of self-competition, in which an advertiser partners with multiple DSPs or bids into multiple exchanges when those are competing for the same impression. In turn, publishers could exploit this advertiser multi-homing through a tactic known as price-fishing"

¹⁵⁵ [REDACTED]

¹⁵⁶ [REDACTED]

¹⁵⁷ Milgrom Report at ¶181

¹⁵⁸ [REDACTED]

102. Publishers' want to maximize revenue, and they use the publisher ad server to do so.¹⁵⁹ Under the first-price auction, advertisers no longer bid their true valuations and instead bid shade, so it would be rational for a publisher to try and get advertisers to increase their bids.¹⁶⁰ Prof. Milgrom agrees that publishers and advertisers have conflicting interests on prices.¹⁶¹

103. If the DFP publisher ad server were independent, then it would have no incentive to reduce publisher revenue via UPR.¹⁶² Instead, as I discuss in my Opening Report, UPR is an example of Google acting on its conflict of interest created via its ownership of the publisher ad server, ad exchange, and ad buying tools.¹⁶³

104. Profs. Milgrom and Baye miss the fact that the publisher ad server is not in the best position to protect advertisers from the rational actions of publishers. Instead, in a market without these conflicts of interest, the ad-buying tool represents the interests of advertisers and hence will be incentivized to protect advertisers from publisher behavior.¹⁶⁴

105. With UPR, Profs. Milgrom and Baye present an overly complex solution (UPR) to a non-issue (price-fishing) that the ad server has no incentive to solve. In the case of price-fishing, publishers and advertisers would not need Google to balance their interests. Instead, the publisher ad server should try to maximize revenue for publishers, and ad buying tools should try

For instance, consider how publishers used Header Bidding to find the best price. "The waterfall's design limits publishers' ability to maximize yield, because it doesn't expose impression opportunities to all of the potential buyers and can't find the best price for each impression. Its sequential nature also makes it a slow process, which causes some impressions to go unsold." Prebid. "A Video Introduction to Header Bidding." Accessed on June 4, 2024. Available at <https://docs.prebid.org/overview/intro-to-header-bidding-video.html>

¹⁵⁹ [REDACTED]

¹⁶⁰ Vickrey, W. (1961). Counterspeculation, Auctions, and Competitive Sealed Tenders. *The Journal of Finance*, 16(1), 8–37. Available at <https://doi.org/10.2307/2977633>.

¹⁶¹ Milgrom Report at ¶24, "it is true that buyers and sellers have conflicting interests regarding prices, which determine how any gains from each transaction are shared."

¹⁶² UPR reduces revenue for publishers, and without the tie, publishers would be incentivized to switch to a different ad server. Becker, Gary S. "Irrational behavior and economic theory." *Journal of Political Economy*, vol. 70, no. 1, 1962, pg. 1-13. See also Hirschman, Albert O.. *Exit, Voice, and Loyalty*. (1970).

¹⁶³ Pathak Report at ¶158 "UPR is also motivated by Google's conflict of interest to use the DFP ad server to give preferential access to the AdX exchange. Google's motivation for UPR was to circumvent high floors for AdX by requiring publishers to set a common floor across all exchanges and ad buying tools." [REDACTED]

¹⁶⁴ Advertisers have incentives to switch if their tools harms them. Becker, Gary S. "Irrational behavior and economic theory." *Journal of Political Economy*, vol. 70, no. 1, 1962, pg. 1-13. See also Hirschman, Albert O.. *Exit, Voice, and Loyalty*. (1970).

to limit how much advertisers overpay for impressions.¹⁶⁵ The simpler solution for Google would have been for each tool to act in the best interests of its customers and allow the industry to develop products and innovations that advance the publishers and advertisers separately.

F. Buy-side conduct: Bernanke

106. Prof. Milgrom states that “one of the motivations for Project Bernanke was to expand output by allowing Google Ads advertisers to purchase otherwise unsold impressions, which was around [REDACTED] of all impressions at the time Bernanke was introduced.”¹⁶⁶

107. However, Profs. Milgrom and Baye do not provide evidence that unsold impressions on AdX were a market-wide problem for publishers or advertisers. Unsold impressions on AdX could mean that the impression is clearing on a different exchange. A publisher may have chosen a high floor for AdX that Bernanke overrides.

108. Prof. Milgrom also states that “if Google did not pursue a program like Bernanke, its advertisers (who had incentives to bid their values) would have been at a disadvantage compared to advertisers using other buy-side tools (who had incentives to bid more than their values).”¹⁶⁷ Prof. Milgrom has not provided evidence of other buying tools submitting single inflated bids to the AdX auction. In addition, his argument is not consistent with his and Google’s arguments that Bernanke exists to purchase “otherwise unsold impressions.”

109. As I discuss in Section VI.D.3, Prof. Milgrom states that Bernanke is [REDACTED]

However, Prof. Milgrom does not consider that using a secret, buy-side program is an inappropriate solution for publishers.¹⁶⁹ If high floors on AdX were leading to unsold impressions

¹⁶⁵ If tools do not serve their customers needs, customers have an incentive to find a new tool. Stigler, George J. “The economics of information.” *Journal of Political Economy*, vol. 69, no. 3, 1961, pg. 213-225. 356; Becker, Gary S. “Irrational behavior and economic theory.” *Journal of Political Economy*, vol. 70, no. 1, 1962, pg. 1-13. See also Hirschman, Albert O.. *Exit, Voice, and Loyalty*. (1970).

¹⁶⁶ Milgrom Report at ¶138. “[REDACTED]”

¹⁶⁷ Milgrom Report at ¶168.

¹⁶⁸ Milgrom Report at ¶157

¹⁶⁹ Transparency ensures the participants are safe to reveal their information such as their willingness to pay without being worse off for disclosing. Secret programs remove a consideration for publishers’ strategic decisions. “Well-designed matching process account the fact that participants are making strategic decisions. Sometimes the goal of the market designer is to reduce the need to game the system, allowing choosers to concentrate on identifying their true needs and desires. Other times the goal is to ensure that even if some gaming is inevitable, the market can still work clearly. A good marketplace makes participation safe and simple.” Roth, A.E., *Who gets what and why: the new economics of match making and market design*, Houghton Mifflin Harcourt, 2015, at p. 11.

for publishers, then publishers would be in a better position than Google to adjust their floors, because publishers would want to optimize their floors for every auction, not just for auctions where Bernanke adjusts bids.¹⁷⁰ Profs. Milgrom and Baye have not provided evidence as to why a publisher is not in the best position to optimize their revenue.

110. In addition, Profs. Milgrom and Baye state that the goal of Bernanke was to increase win rates of Google Ads advertisers.¹⁷¹ However, they do not consider how Google Ads advertisers may have been losing on AdX due to poor matches available. Had Google Ads been able to bid outside AdX, win rates on highly-valued impressions may have increased.

111. As an ad buying tool, Google Ads should maximize an advertiser's return on investment and targeting the right impressions for bidding.¹⁷² An ad buying tool has no incentive to help an ad exchange clear more impressions.¹⁷³ If advertisers are losing impressions that they value highly, then the ad buying tool should increase the bid to better reflect the advertiser's true value or expand inventory access by joining additional exchanges.¹⁷⁴

¹⁷⁰ Cai, H., Riley, J., & Ye, L. (2007). Reserve price signaling. *Journal of Economic Theory*, 135(1), 253-268

Also, Pathak Opening at ¶182. "To illustrate how Project Bernanke leads to marketplace inefficiency, consider an impression valued by the publisher at \$3 made available to AdX with a floor price of \$3. 222 AdX then calls on the ad buying tools to submit bids for the impression. Imagine that the top two Google Ads bids are \$5 and \$4, and there is another ad buying tool named ABC with a top bid of \$6. Remember that the gains from trade is the difference between the advertiser valuation and the publisher valuation, and the most efficient allocation achieves the highest possible gains from trade. Assume first that there is no Project Bernanke. In such a case, the highest bid into the AdX auction is \$6, from the ABC advertiser. As a result, this advertiser would win, and the transaction would lead to \$6-\$3=\$3 in gains from trade. Now assume that Project Bernanke is in effect, and the Google Ads advertiser with the \$5 bid has enough money in their Bernanke pool with this publisher. Then, Google Ads, predicting that there would be a higher bid from another advertiser, inflates the top bid to \$7. Notice however that the advertiser valuation is still \$5. With Project Bernanke, the highest bid in the AdX auction is the inflated bid from the Google Ads advertiser, and this advertiser wins. As a result, the transaction would lead to \$5-\$3=\$2 in gains from trade, which is lower than what would have occurred without Project Bernanke. In this example, Google Ads buyer offer lower quality ads. Hence, Project Bernanke leads to inefficient allocations."

¹⁷¹ Milgrom Report at ¶162 "My empirical analysis suggests that the vast majority of Google Ads advertisers must have benefited from Bernanke whenever Bernanke increased the advertisers' win rates."; Baye Report at ¶603 "Bernanke aimed to further increase the rate at which Google Ads advertisers won AdX auctions while maintaining Google Ads' average revenue share at █ percent."

¹⁷² █

¹⁷³ █

¹⁷⁴ █

112. Neither Prof. Milgrom nor Baye consider the distorted matches created by Google's launch of Bernanke. Publishers receive bids with valuations below floors, and advertisers overpay on impressions to subsidize the pool.¹⁷⁵

113. When Google implemented Bernanke, it distorted match quality. Instead of allowing publishers and advertisers to control floors and bids, Google ran a secret program that distorted the value of the match. High floors are matched with low bids and vice versa. Prof. Milgrom provides no evidence that increasing the number of matches improves match quality for Google's advertisers.

VI. PROF. BAYE'S CRITIQUES OF MY ANALYSIS ARE FLAWED

A. Prof. Baye does not consider how increasing connections between publishers and advertisers creates thicker markets

114. Prof. Baye does not dispute my framework that a successful market "needs to provide thickness," "make[s] it safe for those who have been brought together," and "overcome[s] the congestion that thickness can bring."¹⁷⁶

115. As I explained in my Opening Report, when publisher ad servers and ad buying tools act in the best interest of their customers, markets can become thicker.¹⁷⁷ Publisher ad servers can increase revenue for publishers by working with more exchanges, increasing the likelihood of matching with a buyer with the highest bid for a given impression. Likewise, ad buying tools can

¹⁷⁵ [REDACTED]

¹⁷⁶ Baye Report at ¶665.

¹⁷⁷ Pathak Report at ¶50, "A well-designed marketplace should bring together many participants who want to transact to facilitate the highest quality matches between buyers and sellers and generate the highest total surplus for participants. Alvin Roth describes markets with many buyers and sellers as thick marketplaces. 31 In thick marketplaces, a seller is more likely to find a match to a buyer who wishes to transact, and more likely to sell at a higher price if multiple buyers compete to purchase what the seller is offering. Likewise, buyers benefit from thick markets because they are more likely to find a seller who is an attractive trading partner. In display advertising, publishers have tools to maximize their revenues. As I discussed above, when publishers have access to multiple sources of demand, they can increase their revenues. Publishers can also maximize revenue and protect against low quality ads by using reserve prices, as I discuss in Section XI. Limiting the number of participants of the marketplace on either the publisher side or the advertiser side leads to a thinner marketplace, which results in decreased advertiser and publisher surplus."

Roth, A.E. (2007). The Art of Designing Markets. Harvard Business Review. Available at <https://hbr.org/2007/10/the-art-of-designingmarkets>.

increase return on investment for advertisers by bidding into multiple exchanges, increasing the likelihood of finding a publisher/user that is the best match.¹⁷⁸

116. Prof. Baye ignores how the markets become thicker when publisher ad servers and ad buying tools increase connections for their customers.¹⁷⁹ His statement “that a single integrated company might be more capable of providing these features”¹⁸⁰ ignores the examples such as Header Bidding, where a “fragmented market” was more capable than Google to create thickness and benefit publishers and advertisers.¹⁸¹

117. First, on the sell-side, as I discuss above in Section IV.B and in my Opening Report, under the waterfall system, publishers were not maximizing the value of their impressions.¹⁸² When Header Bidding launched, publishers saw an immediate revenue impact, because publishers could call many exchanges simultaneously and identify the highest bid across

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¹⁸⁰ Baye Report at ¶1665.

¹⁸¹ Pathak Report at ¶144.

¹⁸² Pathak Report at ¶143. “Header Bidding could improve efficiency by replacing the sequential waterfall with a simultaneous auction of auctions”

“In a waterfall, the seller creates a prioritized ranking of their buyer partners. Each time an impression is available for sale, the top partner in the ranking is shown the opportunity and has the option to buy it or refuse it. If they choose to buy, they deliver their ad. If they refuse, the waterfall shows the impression to the next partner in the ranking, and the cycle repeats until a willing buyer is found. The waterfall’s design limits publishers’ ability to maximize yield, because it doesn’t expose impression opportunities to all of the potential buyers and can’t find the best price for each impression. Its sequential nature also makes it a slow process, which causes some impressions to go unsold.” Prebid. “A Video Introduction to Header Bidding.” Accessed on June 4, 2024. Available at <https://docs.prebid.org/overview/intro-to-header-bidding-video.html>

exchanges.¹⁸³ Header Bidding made the markets thicker, and publisher revenue increased as a result.¹⁸⁴

118. Google, as a single integrated company, had no incentive to make the markets thicker through programs such as Header Bidding, because it was focused on maximizing impressions transacted through its own exchange AdX.¹⁸⁵ Prof. Baye has offered no support that an integrated company such as Google is in a better position to create thickness compared to the marketplace, and he offers no response to Google's inherent conflict of interest in using its publisher ad server and ad buying tools to maximize impressions in AdX.

119. In addition, when Google launched a product similar to Header Bidding, Open Bidding, it did not do so with the goal of increasing publisher revenue or making the markets thicker. Instead, as I discuss in Section IV.C, the [REDACTED]
[REDACTED].¹⁸⁶ In addition, as I discuss in my Opening Report, non-AdX exchanges face a [REDACTED] tax in Open Bidding.¹⁸⁷

120. On the buy-side, Google's single, integrated system presented issues for Google Ads, which led to [REDACTED]. As I discuss in my Opening Report, Google Ads

¹⁸³ [REDACTED]

¹⁸⁴ Pathak Report at ¶144. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

¹⁸⁵ [REDACTED]
[REDACTED]
[REDACTED]

¹⁸⁶ [REDACTED]

¹⁸⁷ [REDACTED]
[REDACTED]
[REDACTED]

was concerned that AdX exclusivity harmed advertisers by limiting the number of matches that could be created.¹⁸⁸ [REDACTED]

121. As was the case with the sell-side, Google, as a single integrated company, had no incentive to make the markets thicker by expanding access for its advertisers. Because of Google's inherent conflict of interest to keep its advertisers exclusive to AdX, Prof. Baye has offered no support that an integrated company such as Google is in a better position to create thickness compared to the marketplace. [REDACTED]

122. Prof. Baye misrepresents thickness by defining thickness as participation of many buyers and sellers in auctions – by a single auctioneer.¹⁹¹ The goal of the market design principle of thickness is achieving market-wide thickness.¹⁹² In the context of AdTech, this would translate to the thickness of all AdTech market participants, not just customers of AdX.

B. Prof. Baye's double marginalization argument concedes that DFP and AdX have market power

¹⁸⁸ Pathak Report at ¶113 “Google Ads exclusivity to AdX denied advertiser participation on third-party exchanges, where advertisers could have found relevant matches. The lack of participation created marketplace inefficiency because advertisers could only buy from publishers that used AdX, not other exchanges, limiting the total inventory available for bidding. For instance, it is inefficient for Google Ads advertisers to miss relevant inventory from non-AdX publishers. Under the exclusive arrangement between Google Ads and AdX, Google Ads advertisers had less availability to make relevant matches.”

¹⁸⁹ [REDACTED]

¹⁹⁰ [REDACTED]

⁴ [REDACTED]

¹⁹¹ Baye Report at ¶173.

¹⁹² Market designers consider the key elements of successful markets. Market design economist Alvin Roth summarizes that “To function properly, markets need to do at least three things: 1. They need to provide thickness—that is, to bring together a large enough proportion of potential buyers and sellers to produce satisfactory outcomes for both sides of a transaction.” See Haeringer, G. Market Design: Auctions and Matching. Chapter 1.3.1 What a Market Needs to Work. The MIT Press, 2017. pg. 3-4. See also Roth, A.E. (2007). The Art of Designing Markets. Harvard Business Review. Available at <https://hbr.org/2007/10/the-art-ofdesigning-markets>.

123. Prof. Baye's statement that breaking the integration of DFP and AdX would lead to double marginalization is akin to acknowledging Google's outsized market power. It is well known that elimination of double marginalization is applicable only when two *dominant* firms merge. Double marginalization is only relevant when there is market power in at least one of the levels of the market.¹⁹³ Inefficiencies due to double marginalization arise when there is market power in both the upstream and downstream markets.¹⁹⁴ Prof. Baye's conclusion that a split DFP and AdX would lead to higher prices means that he acknowledges both products have enough market power to charge supra-competitive prices.

124. The view that vertical mergers are invariably efficient, particularly because of elimination of double marginalization, is contradicted by modern economic analysis showing that competitive harm can in fact result from vertical integration when markets are imperfectly competitive.¹⁹⁵ Claims that Elimination of Double Marginalization ("EDM") must lead to lower prices are overstated for various reasons, and the potential for EDM is not a valid rationale for integration.¹⁹⁶

C. Google is not in the best position to internalize externalities

125. Contrary to Google's claims that contracts cannot be enforced in an AdTech environment, contracts can reduce or eliminate externalities. By stating that Google is in the best position to internalize externalities, Google's experts overstate the benefits of vertical integration.¹⁹⁷

126. Revisiting a classic example used in introductory economics classes, consider there are two firms located near a river, with the upstream firm having negative externalities on the downstream firm.¹⁹⁸ With the upstream firm polluting the river, the downstream firm suffers from negative externalities in the form of that pollution. Prof. Baye's logic would imply that the only way

¹⁹³ Joskow, P.L. (2005). Vertical Integration. In: Menard, C., Shirley, M.M. (eds) *Handbook of New Institutional Economics*. Springer, Boston, MA. https://doi.org/10.1007/0-387-25092-1_14

¹⁹⁴ Joskow, P.L. (2005). Vertical Integration. In: Menard, C., Shirley, M.M. (eds) *Handbook of New Institutional Economics*. Springer, Boston, MA. https://doi.org/10.1007/0-387-25092-1_14

¹⁹⁵ Steven C. Salop, Invigorating Vertical Merger Enforcement, 127 *Yale L.J.* 1962-1994 (2018).

¹⁹⁶ Steven C. Salop, Invigorating Vertical Merger Enforcement, 127 *Yale L.J.* 1962-1994 (2018).

¹⁹⁷ Riordan, Michael H., and Steven C. Salop. "EVALUATING VERTICAL MERGERS: A POST-CHICAGO APPROACH." *Antitrust Law Journal* 63, no. 2 (1995): 513-68. <http://www.jstor.org/stable/40843291>.

¹⁹⁸ For a textbook example of externalities, see Gruber, Jonathan. *Public Finance and Public Policy*. New York, NY :Worth Publishers, 2010 for a discussion of negative externalities from an upstream steel firm on downstream fishing at pg 123-124.

to achieve efficiency and internalize externalities here would be to integrate the two firms. However, this logic is only applicable when it is not possible to measure the pollution created by the upstream firm. [REDACTED]

[REDACTED] .²⁰⁰

127. In the AdTech environment, where ownership is perfectly defined and data abundant, vertical integration is not the only way to internalize externalities. Google as a standalone ad server could always price the so-called externalities, and publishers and advertisers would have choice on whether to pay.

128. Prof. Baye's arguments that contracts are insufficient to achieve efficiency in AdTech markets are misplaced. Unlike the river pollution example discussed in previous paragraphs, externalities are measurable in AdTech markets.²⁰¹ When externalities are measurable, they can be priced, and contractual solutions can be negotiated.²⁰² Prof. Baye's arguments that this is not possible in AdTech markets does not effectively dispute the efficiency gains of contracts in AdTech markets.

129. Google's decision to [REDACTED]
[REDACTED]. Prof. Baye states that
had publishers used [REDACTED] .²⁰³

130. Examples are abundant in industry for customers paying a higher price for additional goods. Cloud storage solutions have different pricing tiers for different memory.²⁰⁴ Medical match applicants who want to apply to more than a certain number of schools can pay a price to submit

¹⁹⁹ [REDACTED]

²⁰⁰ Gruber, Jonathan. *Public Finance and Public Policy*. New York, NY : Worth Publishers, 2010.

²⁰¹ [REDACTED]

²⁰² The classic Coase theorem says that when property rights are complete, and parties can negotiate costlessly, negotiations will bring optimal outcomes. Gruber, Jonathan. *Public Finance and Public Policy*. New York, NY : Worth Publishers, 2010 at page 130.

²⁰³ Baye Report at ¶1564. [REDACTED]

²⁰⁴ "Choose the Best Plan for your business" Box. Available at <https://www.box.com/pricing>, accessed September 8, 2024

more applications.²⁰⁵ Pricing for extra is a common practice across many industries, and runs counter to Google's claim that it alone can internalize externalities.

131. Google need not act as a central planner for the AdTech markets. Market forces, and publisher and advertiser choice, are in a better position than Google to achieve efficient outcomes. But-for Google's conduct of the AdX-DFP tie and limiting publisher and advertiser choice, the marketplace would be able to achieve outcomes that are better for publishers and advertisers.

D. Prof. Baye's free-riding arguments are flawed

132. Prof. Baye provides weak support for the assertion that an interoperable system would create free-riding externalities.²⁰⁶ Prof. Baye states that "effectively, the entities at each stage have an incentive to free-ride on promotional investments by those managing other stages, resulting in underinvestment overall" and that "for these reasons, economic theory indicates that Google has stronger incentives to make quality-enhancing and other investments to grow the ecosystem through its integrated ad tech stack than would be the case if it (or independent owners) operated components of the stack independently."²⁰⁷

133. However, Prof. Baye has provided an unconvincing example of [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] For instance, the New York Stock Exchange provides different tiers of prices for data feed access.²⁰⁹ Prof. Baye has not supported why [REDACTED]
[REDACTED]

²⁰⁵ "Extra Rank Fee: For each NRMP program code ranked over 20, NRMP charges an extra rank fee of \$30 per program code up to the maximum of 300 ranks." The National Resident Matching Program. "Match Fees" Available at <https://www.nrmp.org/intro-to-the-match/match-fees/>, accessed September 8, 2024

²⁰⁶ Baye Report at ¶1384. "Another type of externality that arises in unintegrated supply chains is free-riding on demand-enhancing investments."

²⁰⁷ Baye Report at ¶¶384-385

²⁰⁸ Baye Report at FN 609. [REDACTED]
[REDACTED]
[REDACTED]

²⁰⁹ "Real Time Data" NYSE. Available at <https://www.nyse.com/market-data/real-time>, accessed September 8, 2024

134. Furthermore, interoperability between tools would not lead to sharing innovation with competitors. On the contrary, it only necessitates that Google gives equitable access to paying customers. Google has acted on incentives to shrink the ecosystem for its customers, rather than grow the system. As I explained in my Opening Report and above in Section V.B, Google could have offered Third-Party Dynamic Allocation to third-party ad servers and increased inventory access on AdX.

E. Prof. Baye's quality investment arguments are flawed

135. Prof. Baye states that without the integration, and thus the tie, Google would have no incentive to invest in quality improvements for publishers, advertisers, and users.²¹⁰

136. However, Prof. Baye does not address that in many cases, Google was reactive to the industry in providing quality. Publishers regularly complained about the quality of AdX.²¹¹ In addition, an analytics company [REDACTED]

137. Similarly, Google implemented changes that [REDACTED]. As I discussed in my Opening Report, conducts such as the [REDACTED]

[REDACTED].²¹³

²¹⁰ Baye Report at ¶1385 “For these reasons, economic theory indicates that Google has stronger incentives to make quality-enhancing and other investments to grow the ecosystem through its integrated ad tech stack than would be the case if it (or independent owners) operated components of the stack independently. These include investments not only in features of its ad tech tools that benefit advertisers, publishers, and users, but investments to promote the Internet more generally.”

²¹¹ [REDACTED]

²¹² [REDACTED]

²¹³ Pathak Opening at ¶19. “Google’s requirement that publishers who use its DFP ad server must license Google’s AdX worked against the interests of publisher customers by limiting their choice and protected AdX from the threat of disintermediation. Google Ads exclusivity to AdX denied advertisers the option to participate on other third-party exchanges, where they could have found better matches and realized greater surplus[...] Google’s effort to impede the adoption of Header Bidding prevented the participation of competing exchanges and the development of a thicker marketplace, where competition between exchanges could take place on the merits. This, in turn, reduced overall marketplace efficiency and the total surplus of the marketplace [...] Google’s Unified Pricing Rules

138. In addition, as discussed in Section V.B above, Google had no incentive to improve revenue from other exchanges for publishers, and thus did not invest in innovations to bring simultaneous real-time bidding for everyone.

139. Google also was reactive in addressing privacy concerns on AdX, even though Prof. Baye touts Google's investment in privacy and safety.²¹⁴ For instance, [REDACTED]

[REDACTED]²¹⁵ [REDACTED]

[REDACTED]

[REDACTED] It was the industry who identified quality problems in ad exchanges and invested in solutions, not Google.

F. Prof. Baye's argument about competition with walled gardens is flawed because Meta exited the display market

140. Prof. Baye claims that breaking the tie between DFP and AdX would make it more difficult for Google to compete with walled gardens such as Meta.²¹⁷ However, Prof. Baye ignores the fact that Meta exited the display advertising market and could not compete with Google.²¹⁸

gave preferential treatment to AdX and Google's ad buying tools to the detriment of publishers. UPR reduced the ability of publishers to maximize revenue by setting different reserve prices for distinct demand sources and limited their ability to ensure high-quality advertisements. These restrictions on publisher choice were done to benefit AdX [...] Google's deployment of Project Bernanke, Dynamic Revenue Sharing, and RPO reduced transparency for publishers and advertisers to benefit AdX. These non-disclosed conducts made it difficult for market participants to best respond to market rules and understand how their actions translate into market outcomes."

²¹⁴ Baye Report at ¶1395. "AdX is considered a high-quality exchange for publishers, with efficient monetization, advanced safety measures, greater control, and convenience."

²¹⁵ "Only 13 percent of the 10,000 most popular domains that sell digital ads adopted ads.txt in the 100 days following its release by the Interactive Advertising Bureau Tech Lab in May. But between mid-September and the end of October, that number jumped to 44 percent, according to data from Ad Ops Insider publisher Ben Kneen. The time frame of the uptick in adoption overlaps with Google's recent announcements that several of its most popular ad products will begin filtering for ads.txt." Digiday. "It can be good to have a big stick': Thanks to Google, ads.txt is taking off." <https://digiday.com/media/can-good-big-stick-thanks-google-ads-txt-taking-off/>

²¹⁶ "The IAB Tech Lab launched ads.txt as a tool to help ad buyers avoid illegitimate sellers that arbitrage inventory and spoof domains. The way that ads.txt works is that publishers drop a text file on their web servers that lists all the companies authorized to sell their inventory, which allows buyers to check the validity of the inventory they purchase. If a publisher uses ads.txt, then anyone with an internet connection can verify the publisher's authorized sellers." Digiday. "It can be good to have a big stick': Thanks to Google, ads.txt is taking off." <https://digiday.com/media/can-good-big-stick-thanks-google-ads-txt-taking-off/>

²¹⁷ Baye Report at ¶1674.: "Professor Pathak does not consider that his structural remedy is likely to weaken Google's ability to compete with Meta, Microsoft, Amazon, and other large, integrated platforms."

²¹⁸ [REDACTED]

[REDACTED]

141. [REDACTED]
[REDACTED]. In addition, Meta exited the display market [REDACTED].²¹⁹

142. In addition, as part of considerations for the FAN deal, Meta recognized that [REDACTED]
[REDACTED]
[REDACTED]

143. Prof. Baye's contention that Google needs to maintain its DFP-AdX tie to compete with competitors such as Meta, ignores how Meta is not a competitor at all—it tried to enter the market and failed. In addition, he ignores both the costs (building completely new adtech) and incentives required for a new entrant to compete against Google's position.²²¹ As a result, Prof. Baye's conclusions do not change my opinions. Rather, my analysis of his conclusions reinforces my opinion that Google's tie has allowed it to maintain its position in the market.

²¹⁹ [REDACTED]

[REDACTED]

[REDACTED]

The Facebook Audience Network currently only participate in mobile apps. See "Monetize Your Mobile Game," Meta Audience Network, available at <https://www.facebook.com/audiencenetwork/> accessed on September 9, 2024.

²²⁰ [REDACTED]

²²¹ [REDACTED]

Appendix A: Materials Relied Upon & Materials Considered

MATERIALS RELIED UPON

Expert Reports

1. 2024.07.30 Expert Report of Anindya Ghose
2. 2024.07.30 Expert Report of Paul R. Milgrom
3. 2024.07.30 Expert Report of Steven N. Wiggins
4. 2024.08.06 Expert Report of Michael R. Baye
5. 2024.08.06 Expert Report of Jason Nieh

Academic Articles

1. Roth, A.E. (2015). *Who gets what and why: the new economics of match making and market design*, Houghton Mifflin Harcourt
2. Roth, A.E. (2007). The Art of Designing Markets. *Harvard Business Review*.
3. Becker, Gary S. (1962) "Irrational behavior and economic theory." *Journal of Political Economy*, vol. 70, no. 1, . 1-13.
4. Cai, H., Riley, J., & Ye, L. (2007). Reserve price signaling. *Journal of Economic Theory*, 135(1), 253-268
5. Gruber, Jonathan. (2005). *Public Finance and Public Policy*. New York, NY: Worth Publishers,
6. Hirschman, Albert O.. (1970). *Exit, Voice, and Loyalty*. Harvard University Press.
7. Joskow, P.L. (2010). Vertical Integration. In: Menard, C., Shirley, M.M. (eds) *Handbook of New Institutional Economics*. Springer, Boston, MA.
8. Kreps, David M., (2012). "Microeconomic Foundations I: Choice and Competitive Markets," Economics Books, Princeton University Press, edition 1, volume 1, number 9890
9. Krishna, V. (2010). *Auction Theory*. Academic Press. Available at <https://doi.org/10.1016/B978-0-12-374507-1.00015-7>
10. Pathak P.A. What Really Matters in Designing School Choice Mechanisms. In: Honoré B, Pakes A, Piazzesi, M., Samuelson L, eds. *Advances in Economics and Econometrics: Eleventh World Congress*. Econometric Society Monographs. Cambridge University Press; 2017:176-214.
11. Stigler, George J. (1961). "The economics of information." *Journal of Political Economy*, vol. 69, no. 3, pg. 213-225

12. Riordan, Michael H., and Steven C. Salop. (1995). "EVALUATING VERTICAL MERGERS: A POST-CHICAGO APPROACH." *Antitrust Law Journal* 63, no. 2 513–68. <http://www.jstor.org/stable/40843291>.
13. Salop, Steven C. (2018). Invigorating Vertical Merger Enforcement, 127 Yale L.J. 1962-1994.
14. Vickrey, W. (1961). Counterspeculation, Auctions, and Competitive Sealed Tenders. *The Journal of Finance*, 16(1), 8–37. Available at <https://doi.org/10.2307/2977633>

Public Sources

1. "'It can be good to have a big stick': Thanks to Google, ads.txt is taking off." <https://digiday.com/media/can-good-big-stick-thanks-google-ads-txt-taking-off/>
2. "Publisher Trust Index: Methodology," Picalate, available at <https://www.picalate.com/publisher-trust-index-methodology>
3. "GroupM and Index are expected to sign a formal, non-exclusive partnership in the first weeks of March around these goals." GroupM Partners With Index Exchange As Hold Cos Lean Into SSPs" AdExchanger, March 2, 2020. Available at <https://www.adexchanger.com/agencies/groupm-partners-with-index-exchange-as-hold-cos-lean-into-ssps/>
4. "Choose the Best Plan for your business" Box. Available at <https://www.box.com/pricing>, accessed September 8, 2024
5. "Seller Trust Index; Top Website SSPs," Picalate, North America, Q1 2024. Available at <https://ratings.picalate.com/rankings/domain/seller-trust-index/NA/20240301>
6. "Auction Model," Google Ad Manager Help, available at <https://support.google.com/admanager/answer/152039>
7. "Choose the Best Plan for your business" Box. Available at <https://www.box.com/pricing>, accessed September 8, 2024
8. "Extra Rank Fee: For each NRMP program code ranked over 20, NRMP charges an extra rank fee of \$30 per program code up to the maximum of 300 ranks." The National Resident Matching Program. "Match Fees" Available at <https://www.nrmp.org/intro-to-the-match/match-fees/>, accessed September 8, 2024
9. "Introduction to Open Bidding," Google Ad Manager Help. Available at <https://support.google.com/admanager/answer/7128453?hl=en>. Accessed September 8, 2024.
10. "Real Time Data" NYSE. Available at <https://www.nyse.com/market-data/real-time>, accessed September 8, 2024

11. "Monetize Your Mobile Game," Meta Audience Network, available at <https://www.facebook.com/audiencenetwork/> accessed on September 9, 2024.
12. "Value CPM," Google Ad Manager (accessed Oct. 15, 2023), <https://support.google.com/admanager/answer/177222?hl=en>
13. Prebid. "A Video Introduction to Header Bidding." Accessed on June 4, 2024. Available at <https://docs.prebid.org/overview/intro-to-header-bidding-video.html>
14. GroupM Partners With Index Exchange As Hold Cos Lean Into SSPs" AdExchanger, March 2, 2020. Available at <https://www.adexchanger.com/agencies/groupm-partners-with-index-exchange-as-hold-cos-lean-into-ssps/>
15. Sarah Sluis, AdExchanger. "The Rise Of 'Header Bidding' And The End Of The Publisher Waterfall" (Jun. 18, 2015). Accessed on June 4, 2024. Available at <https://www.adexchanger.com/publishers/the-rise-of-header-bidding-and-the-end-of-the-publisher-waterfall/>

Bates Stamped Production

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| GOOG-DOJ-14954902 | GOOG-AT-MDL-003995286 |
| GOOG-DOJ-14826585 | GOOG-NE-13547436 |
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| GOOG-NE-05243813 | GOOG-DOJ-AT-01804815 |
| GOOG-DOJ-28420330 | GOOG-NE-07249237 |
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| | [REDACTED] Google Ads Data - GOOG-AT- |
| | MDL-DATA-000486626 - GOOG-AT-MDL- |
| | DATA-000488277 |

Depositions Referenced

1. Deposition of [REDACTED] (September 05, 2023)
2. Deposition of [REDACTED] (August 23, 2023)
3. Deposition of [REDACTED] (April 30, 2024)
4. Deposition of [REDACTED] (May 24, 2024)
5. Deposition of [REDACTED] (April 29, 2024)

MATERIALS CONSIDERED

Discovery Responses

All available discovery responses produced within the matter of *The State of Texas, et al. v. Google*, Case Number: 4:20-cv-00957-SDJ, including:

1. The Parties' amended initial disclosures;
2. The Parties' discovery responses and objections to Interrogatories, Requests for Admission, and Requests for Production; and
3. Google's written responses to Plaintiffs' Rule 30(b)(6) Notice.

Deposition Transcripts & Exhibits

All available deposition transcripts and exhibits within the matter of *The State of Texas, et al. v. Google*, Case Number: 4:20-cv-00957-SDJ, including:

1. Deposition and Exhibits of [REDACTED], April 1, 2024
2. Deposition and Exhibits of [REDACTED], April 3, 2024
3. Deposition and Exhibits of [REDACTED], April 12, 2024
4. Deposition and Exhibits of [REDACTED], April 17, 2024
5. Deposition and Exhibits of [REDACTED], April 19, 2024
6. Deposition and Exhibits of [REDACTED], April 23, 2024
7. Deposition and Exhibits of [REDACTED], April 26, 2024
8. Deposition and Exhibits of [REDACTED], April 26, 2024
9. Deposition and Exhibits of [REDACTED], April 29, 2024
10. Deposition and Exhibits of [REDACTED], April 30, 2024
11. Deposition and Exhibits of [REDACTED], May 1, 2024
12. Deposition and Exhibits of [REDACTED], May 1, 2024
13. Deposition and Exhibits of [REDACTED], May 2, 2024
14. Deposition and Exhibits of [REDACTED], April 5, 2024
15. Deposition and Exhibits of [REDACTED], May 2, 2024
16. Deposition and Exhibits of [REDACTED], May 10, 2024
17. Deposition and Exhibits of [REDACTED], May 15, 2024
18. Deposition and Exhibits of [REDACTED], May 17, 2024
19. Deposition and Exhibits of [REDACTED], Vol 1, April 26, 2024
20. Deposition and Exhibits of [REDACTED], Vol 2, May 21, 2024
21. Deposition and Exhibits of [REDACTED], May 21, 2024
22. Deposition and Exhibits of [REDACTED], May 22, 2024
23. Deposition and Exhibits of [REDACTED], May 23, 2024
24. Deposition and Exhibits of [REDACTED], May 24, 2024
25. Deposition and Exhibits of [REDACTED], Vol 1, April 19, 2024
26. Deposition and Exhibits of [REDACTED], Vol 2, May 2, 2024
27. Deposition and Exhibits of [REDACTED], Vol 3, May 3, 2024
28. Deposition and Exhibits of [REDACTED], Vol 4, May 24, 2024
29. Deposition and Exhibits of [REDACTED], May 2, 2024
30. Deposition and Exhibits of [REDACTED], May 23, 2024
31. Deposition and Exhibits of [REDACTED], May 3, 2024
32. Deposition and Exhibits of [REDACTED], May 3, 2024
33. Deposition and Exhibits of [REDACTED], May 23, 2024
34. Deposition and Exhibits of [REDACTED], April 30, 2024
35. Deposition and Exhibits of [REDACTED], May 2, 2024
36. Deposition and Exhibits of [REDACTED], May 1, 2024
37. Deposition and Exhibits of [REDACTED], May 1, 2024
38. Deposition and Exhibits of [REDACTED], April 16, 2024
39. Deposition and Exhibits of [REDACTED], April 23, 2024

40. Deposition and Exhibits of [REDACTED], April 25, 2024
41. Deposition and Exhibits of [REDACTED], April 12, 2024
42. Deposition and Exhibits of [REDACTED], April 19, 2024
43. Deposition and Exhibits of [REDACTED], April 30, 2024
44. Deposition and Exhibits of [REDACTED], May 2, 2024
45. Deposition and Exhibits of [REDACTED], May 3, 2024
46. Deposition and Exhibits of [REDACTED], May 1, 2024
47. Deposition and Exhibits of [REDACTED], Inc., April 22, 2024
48. Deposition and Exhibits of [REDACTED], May 1, 2024
49. Deposition and Exhibits of [REDACTED], May 3, 2024
50. Deposition and Exhibits of [REDACTED], April 29, 2024
51. Deposition and Exhibits of [REDACTED], April 25, 2024
52. Deposition and Exhibits of [REDACTED], April 23, 2024
53. Deposition and Exhibits of [REDACTED], April 26, 2024
54. Deposition and Exhibits of [REDACTED], April 26, 2024
55. Deposition and Exhibits of [REDACTED], April 29, 2024
56. Deposition and Exhibits of [REDACTED], May 1, 2024
57. Deposition and Exhibits of [REDACTED], May 3, 2024
58. Deposition and Exhibits of [REDACTED], April 22, 2024
59. Deposition and Exhibits of [REDACTED], May 3, 2024
60. Deposition and Exhibits of [REDACTED], May 3, 2024
61. Deposition and Exhibits of [REDACTED], April 25, 2024
62. Deposition and Exhibits of [REDACTED], May 3, 2024
63. Deposition and Exhibits of [REDACTED], April 25, 2024
64. Deposition and Exhibits of [REDACTED], April 25, 2024
65. Deposition and Exhibits of [REDACTED], May 10, 2024
66. Deposition and Exhibits of [REDACTED], May 1, 2024
67. Deposition and Exhibits of [REDACTED] May 2, 2024
68. Deposition and Exhibits of [REDACTED] May 1, 2024
69. Deposition and Exhibits of [REDACTED], April 29, 2024
70. Deposition and Exhibits of [REDACTED], May 24, 2024
71. Deposition and Exhibits of [REDACTED] April 17, 2024
72. Deposition and Exhibits of [REDACTED], April 30, 2024
73. Deposition and Exhibits of [REDACTED], April 30, 2024
74. Deposition and Exhibits of [REDACTED]
[REDACTED] May 1, 2024
75. Deposition and Exhibits of [REDACTED]
[REDACTED], May 1, 2024
76. Deposition and Exhibits of [REDACTED]
[REDACTED] May 3, 2024

- 77. Deposition and Exhibits of [REDACTED]), April 3, 2024
- 78. Deposition and Exhibits of [REDACTED]), May 2, 2024
- 79. Deposition and Exhibits of [REDACTED]), May 1, 2024
- 80. Deposition and Exhibits of [REDACTED]), May 3, 2024
- 81. Deposition and Exhibits of [REDACTED]), May 3, 2024
- 82. Deposition and Exhibits of [REDACTED]
[REDACTED]), April 29, 2024
- 83. Deposition and Exhibits of [REDACTED]), April 29, 2024
- 84. Deposition and Exhibits of [REDACTED]), April 19, 2024

All available deposition transcripts and exhibits within the matter of *USA v. Google*, Case Number: 1:23-cv-00108-LMB-JFA, including:

- 85. Deposition and Exhibits of [REDACTED] August, 16 2023
- 86. Deposition and Exhibits of [REDACTED] September 1, 2023
- 87. Deposition and Exhibits of [REDACTED], August 29, 2023
- 88. Deposition and Exhibits of [REDACTED], September 6, 2023
- 89. Deposition and Exhibits of [REDACTED], September 8, 2023
- 90. Deposition and Exhibits of [REDACTED] September 29, 2024
- 91. Deposition and Exhibits of [REDACTED], September 5, 2023
- 92. Deposition and Exhibits of [REDACTED], September 26, 2023
- 93. Deposition and Exhibits of [REDACTED], September 8, 2023
- 94. Deposition and Exhibits of [REDACTED], September 26, 2023
- 95. Deposition and Exhibits of [REDACTED], August 9, 2023
- 96. Deposition and Exhibits of [REDACTED] August 31, 2023
- 97. Deposition and Exhibits of [REDACTED], September 22, 2023
- 98. Deposition and Exhibits of [REDACTED], September 28, 2023
- 99. Deposition and Exhibits of [REDACTED] September 8, 2023
- 100. Deposition and Exhibits of [REDACTED], September 21, 2023
- 101. Deposition and Exhibits of [REDACTED], August 25, 2023
- 102. Deposition and Exhibits of [REDACTED] August 25, 2023
- 103. Deposition and Exhibits of [REDACTED] September 22, 2023
- 104. Deposition and Exhibits of [REDACTED], September 29, 2023
- 105. Deposition and Exhibits of [REDACTED], August 29, 2023
- 106. Deposition and Exhibits of [REDACTED], October 26, 2023
- 107. Deposition and Exhibits of [REDACTED], July 28, 2023
- 108. Deposition and Exhibits of [REDACTED] August 23, 2023
- 109. Deposition and Exhibits of [REDACTED] September 28, 2023
- 110. Deposition and Exhibits of [REDACTED] (November, 11, 2023)

111. Deposition and Exhibits of [REDACTED] (August 15, 2023)
112. Deposition and Exhibits of [REDACTED] (November 14, 2023)
113. Deposition and Exhibits of [REDACTED] (November 15, 2023)
114. Deposition and Exhibits of [REDACTED] (November 14, 2023)
115. Deposition and Exhibits of [REDACTED] (30B6 errata only) (November 14, 2023)
116. Deposition and Exhibits of [REDACTED] (November 3, 2023)
117. Deposition and Exhibits of [REDACTED] (August 16, 2023)
118. Deposition and Exhibits of [REDACTED] (November 7, 2023)
119. Deposition and Exhibits of [REDACTED] (November 9, 2023)
120. Deposition and Exhibits of [REDACTED] (October 30, 2023)
121. Deposition and Exhibits of [REDACTED] (August 11, 2023)
122. Deposition and Exhibits of [REDACTED] (November 2, 2023)
123. Deposition and Exhibits of [REDACTED] (November 16, 2023)
124. Deposition and Exhibits of [REDACTED] (August 29, 2023)
125. Deposition and Exhibits of [REDACTED] (November 14-15, 2023)
126. Deposition and Exhibits of [REDACTED] (April 1, 2024)
127. Deposition and Exhibits of [REDACTED] (November 3, 2024)
128. Deposition and Exhibits of [REDACTED] (November 3, 2024)
129. Deposition and Exhibits of [REDACTED] (30(b)6) (November 14, 2023)
130. Deposition and Exhibits of [REDACTED] (August 16, 2023)
131. Deposition and Exhibits of [REDACTED] (November 7, 2023)
132. Deposition and Exhibits of [REDACTED] (November 9, 2023)
133. Deposition and Exhibits of [REDACTED] (April 3, 2024)
134. Deposition and Exhibits of [REDACTED] (October 10, 2023 and November 8, 2023)
135. Deposition and Exhibits of [REDACTED] (April 17, 2024)
136. Deposition and Exhibits of [REDACTED] (April 29, 2024)
137. Deposition and Exhibits of [REDACTED] (November 11, 2023)
138. Deposition and Exhibits of [REDACTED] (October 10, 2023)

All available deposition transcripts and exhibits within the matter of *In re: Google Digital Advertising Antitrust Litigation*, Case Number: 1:21-md-03010-PKC, including the depositions and exhibits of:

- | | | |
|------|-------------|-----------|
| 139. | [REDACTED] | 6/19/2024 |
| 140. | [REDACTED] | 6/20/2024 |
| 141. | [REDACTED]) | 6/21/2024 |
| 142. | [REDACTED]) | 5/21/2024 |
| 143. | [REDACTED] | 6/25/2024 |
| 144. | [REDACTED] | 6/25/2024 |
| 145. | [REDACTED]) | 6/27/2024 |
| 146. | [REDACTED]) | 7/23/2024 |
| 147. | [REDACTED] | 7/23/2024 |

Highly Confidential

| | | |
|------|-------------------------|-----------|
| 148. | [REDACTED] | 6/18/2024 |
| 149. | [REDACTED] | 5/7/2024 |
| 150. | [REDACTED] (Advertiser) | 7/9/2024 |
| 151. | [REDACTED] | 7/10/2024 |
| 152. | [REDACTED] | 4/25/2024 |
| 153. | [REDACTED] | 7/10/2024 |
| 154. | [REDACTED] | 6/24/2024 |
| 155. | [REDACTED] | 7/12/2024 |
| 156. | [REDACTED] | 6/12/2024 |
| 157. | [REDACTED] | 6/13/2024 |
| 158. | [REDACTED] | 5/2/2024 |
| 159. | [REDACTED]) | 6/28/2024 |
| 160. | [REDACTED] | 6/6/2024 |
| 161. | [REDACTED] | 6/28/2024 |
| 162. | [REDACTED]) | 7/3/2024 |
| 163. | [REDACTED] | 6/4/2024 |
| 164. | [REDACTED]) | 7/28/2024 |
| 165. | [REDACTED] | 7/10/2024 |
| 166. | [REDACTED] | 6/25/2024 |
| 167. | [REDACTED] | 6/26/2024 |
| 168. | [REDACTED] | 6/10/2024 |
| 169. | [REDACTED] | 6/27/2024 |
| 170. | [REDACTED] | 6/13/2024 |
| 171. | [REDACTED] | 6/7/2024 |
| 172. | [REDACTED] | 6/25/2024 |
| 173. | [REDACTED] | 6/28/2024 |
| 174. | [REDACTED] | 5/24/2024 |
| 175. | [REDACTED] | 6/24/2024 |
| 176. | [REDACTED] | 6/27/2024 |
| 177. | [REDACTED]) | 6/11/2024 |
| 178. | [REDACTED]) | 6/12/2024 |

Other available deposition transcripts and exhibits, including the depositions and exhibits of:

| | | |
|------|------------|------------|
| 179. | [REDACTED] | 10/2/2020 |
| 180. | [REDACTED] | 10/16/2020 |
| 181. | [REDACTED] | 7/28/2020 |
| 182. | [REDACTED] | 7/21/2020 |
| 183. | [REDACTED] | 10/26/2020 |
| 184. | [REDACTED] | 11/6/2020 |
| 185. | [REDACTED] | 7/31/2020 |

| | | |
|------|-----------------|------------|
| 186. | [REDACTED] | 9/25/2020 |
| 187. | [REDACTED] | 10/20/2020 |
| 188. | [REDACTED] | 7/17/2020 |
| 189. | [REDACTED] | 11/9/2020 |
| 190. | [REDACTED] | 11/19/2020 |
| 191. | [REDACTED] | 7/24/2020 |
| 192. | [REDACTED] | 7/14/2020 |
| 193. | [REDACTED] | 11/10/2020 |
| 194. | [REDACTED] bbie | 11/2/2020 |
| 195. | [REDACTED] | 9/28/2020 |
| 196. | [REDACTED] | 2/3/2022 |
| 197. | [REDACTED] | 8/11/2021 |
| 198. | [REDACTED] | 2/28/2022 |
| 199. | [REDACTED] | 10/19/2021 |
| 200. | [REDACTED] | 12/9/2021 |
| 201. | [REDACTED] | 9/17/2021 |
| 202. | [REDACTED] | 11/20/2020 |
| 203. | [REDACTED] | 3/30/2021 |
| 204. | [REDACTED] | 10/28/2021 |
| 205. | [REDACTED] | 8/10/2021 |
| 206. | [REDACTED] | 3/31/2021 |
| 207. | [REDACTED] | 4/2/2021 |
| 208. | [REDACTED] | 4/22/2021 |
| 209. | [REDACTED] | 10/28/2021 |
| 210. | [REDACTED] | 7/22/2021 |
| 211. | [REDACTED] | 10/6/2021 |
| 212. | [REDACTED] | 7/20/2021 |
| 213. | [REDACTED] | 8/12/2021 |
| 214. | [REDACTED] | 9/28/2021 |
| 215. | [REDACTED] | 5/17/2021 |
| 216. | [REDACTED] | 9/7/2021 |

Expert Reports & Declarations

All available expert reports, including appendices, backup materials, and cited materials, within the matter of *The State of Texas, et al. v. Google*, Case Number: 4:20-cv-00957-SDJ, including:

- 16. 2024.06.07 Expert Report of Jeffrey S. Andrien
- 17. 2024.06.07 Expert Report of Joshua Gans, as well as 2024.07.24 Errata and Supplemental Appendix D

18. 2024.06.07 Expert Report of Jacob Hostetler
19. 2024.06.07 Expert Report of John Chandler
20. 2024.06.07 Expert Report of Matthew Weinberg
21. 2024.06.07 Expert Report of Parag Pathak

22. 2024.07.30 Expert Report of Anindya Ghose
23. 2024.07.30 Expert Report of Donna L. Hoffman
24. 2024.07.30 Expert Report of Douglas Skinner
25. 2024.07.30 Expert Report of Itamar Simonson
26. 2024.07.30 Expert Report of Martin C. Rinard
27. 2024.07.30 Expert Report of Paul R. Milgrom
28. 2024.07.30 Expert Report of Steven N. Wiggins
29. 2024.08.06 Expert Report of Michael R. Baye
30. 2024.08.06 Expert Report of Jason Nieh

All available expert reports (with redactions) within the matter of *USA v. Google*, Case Number: 1:23-cv-00108-LMB-JFA, including:

1. Declarations of Google Employees
2. 2023.12.22 Expert Report of Gabriel Weintraub, GOOG-AT-MDL-C-000018734
3. 2023.12.22 Expert Report of R. Ravi, GOOG-AT-MDL-C-000019017
4. 2023.12.22 Expert Report of Robin S. Lee, GOOG-AT-MDL-C-000019273
5. 2023.12.22 Expert Report of Rosa Abrantes-Metz, GOOG-AT-MDL-C-000019786
6. 2023.12.22 Expert Report of Thomas S. Respass, GOOG-AT-MDL-C-000020106
7. 2023.12.22 Expert Report of Timothy Simcoe, GOOG-AT-MDL-C-000020274
8. 2024.01.13 Errata to Abrantes-Metz Expert Report, GOOG-AT-MDL-C-000020435
9. 2024.01.13 Errata to Ravi Expert Report, GOOG-AT-MDL-C-000020437
10. 2024.01.13 Errata to Respass Expert Report, GOOG-AT-MDL-C-000020440
11. 2024.01.13 Errata to Simcoe Expert Report, GOOG-AT-MDL-C-000020467
12. 2024.01.13 Errata to Weintraub Expert Report, GOOG-AT-MDL-C-000020471
13. 2024.01.23 Chevalier Expert Report, GOOG-AT-MDL-C-000020474
14. 2024.01.23 Ferrante Expert Report, GOOG-AT-MDL-C-000020714
15. 2024.01.23 Ghose Expert Report, GOOG-AT-MDL-C-000020767
16. 2024.01.23 Israel Expert Report, GOOG-AT-MDL-C-000021036
17. 2024.01.23 Milgrom Expert Report, GOOG-AT-MDL-C-000021794
18. 2024.01.23 Rinard Expert Report, GOOG-AT-MDL-C-000022191
19. 2024.01.23 Shirky Expert Report, GOOG-AT-MDL-C-000022229

20. 2024.01.23 Simonson Expert Report, GOOG-AT-MDL-C-000022290
21. 2024.01.23 Skinner Expert Report, GOOG-AT-MDL-C-000022948
22. 2024.02.13 Expert Rebuttal Report of Adoria Lim, GOOG-AT-MDL-C-000023002
23. 2024.02.13 Expert Rebuttal Report of Gabriel Weintraub, GOOG-AT-MDL-C-000023226
24. 2024.02.13 Expert Rebuttal Report of Kenneth Wilbur, GOOG-AT-MDL-C-000023322
25. 2024.02.13 Expert Rebuttal Report of R. Ravi, GOOG-AT-MDL-C-000023435
26. 2024.02.13 Expert Rebuttal Report of Robin S. Lee, GOOG-AT-MDL-C-000023516
27. 2024.02.13 Expert Rebuttal Report of Rosa Abrantes-Metz, GOOG-AT-MDL-C-000023887
28. 2024.02.13 Expert Rebuttal Report of Timothy Simcoe, GOOG-AT-MDL-C-000024064
29. 2024.02.13 Expert Rebuttal Report of Wayne Hoyer, GOOG-AT-MDL-C-000024138
30. 2024.02.13 Expert Rebuttal Report of Wenke Lee, GOOG-AT-MDL-C-000024270
31. 2024.02.16 Errata to Ravi Rebuttal Report, GOOG-AT-MDL-C-000024387
32. 2024.02.20 Errata to Simcoe Rebuttal Report, GOOG-AT-MDL-C-000024389
33. 2024.02.23 Errata to Weintraub Rebuttal Report, GOOG-AT-MDL-C-000024390
34. 2024.02.23 Supplemental Errata to Weintraub Expert Report, GOOG-AT-MDL-C-000024391
35. 2024.02.24 Errata to Wilbur Rebuttal Report, GOOG-AT-MDL-C-000024392
36. 2024.02.26 Errata to Hoyer Rebuttal Report, GOOG-AT-MDL-C-000024397
37. 2024.02.28 Errata to Abrantes-Metz Rebuttal Report, GOOG-AT-MDL-C-000024399
38. 2024.03.04 Expert Supplemental Report of Robin S. Lee, GOOG-AT-MDL-C-000024403
39. 2024.03.08 Consolidated Errata to Lee Rebuttal Report, GOOG-AT-MDL-C-000024436
40. 2024.01.13 Expert Report of Weintraub Errata, GOOG-AT-MDL-C-000040965
41. 2024.01.13 Expert Report of Simcoe Errata, GOOG-AT-MDL-C-000040961
42. 2024.01.13 Expert Report of Respass Errata_with Figure Errata_Redacted, GOOG-AT-MDL-C-000040934
43. 2024.01.13 Expert Report of R Ravi Errata, GOOG-AT-MDL-C-000040931
44. 2024.01.13 Expert Report of Abrantes-Metz Errata, GOOG-AT-MDL-C-000040929
45. 2024.03.08 Consolidated Errata to Lee Rebuttal Report, GOOG-AT-MDL-C-000040926
46. 2024.03.04 Expert Supplemental Report of Robin S. Lee, PhD, GOOG-AT-MDL-C-000040893

47. 2024.02.28 Rebuttal Report Errata of Rosa Abrantes-Metz Signed, GOOG-AT-MDL-C-000040889
48. 2024.02.25 Expert Rebuttal Report of Hoyer Errata, GOOG-AT-MDL-C-000040887
49. 2024.02.24 Wilbur Rebuttal Errata, GOOG-AT-MDL-C-000040882
50. 2024.02.23 Weintraub Rebuttal Report Errata, GOOG-AT-MDL-C-000040881
51. 2024.02.23 Expert Report of Weintraub Supplemental Errata, GOOG-AT-MDL-C-000040880
52. 2024.02.20 Errata to Simcoe Rebuttal Report, GOOG-AT-MDL-C-000040879
53. 2024.02.16 Errata to Ravi Rebuttal Report (Highly Confidential), GOOG-AT-MDL-C-000040877
54. 2024.02.13 Rebuttal Report of Rosa Abrantes-Metz, GOOG-AT-MDL-C-000040700
55. 2024.02.13 Expert Report of Wenke Lee, GOOG-AT-MDL-C-000040583
56. 2024.02.13 Expert Rebuttal Report of Wayne Hoyer, GOOG-AT-MDL-C-000040451
57. 2024.02.13 Expert Rebuttal Report of Timothy Simcoe_Redacted, GOOG-AT-MDL-C-000040377
58. 2024.02.13 Expert Rebuttal Report of Robin S. Lee_Redacted, GOOG-AT-MDL-C-000040006
59. 2024.02.13 Expert Rebuttal Report of R Ravi, GOOG-AT-MDL-C-000039925
60. 2024.02.13 Expert Rebuttal Report of Kenneth Wilbur_Redacted, GOOG-AT-MDL-C-000039812
61. 2024.02.13 Expert Rebuttal Report of Gabriel Weintraub_Redacted, GOOG-AT-MDL-C-000039716
62. 2024.02.13 Expert Rebuttal Report of Adoria Lim_Redacted, GOOG-AT-MDL-C-000039492
63. 2024.01.23 Expert Report of William Clay Shirky, GOOG-AT-MDL-C-000039431
64. 2024.01.23 Expert Report of Paul R. Milgrom, GOOG-AT-MDL-C-000039034
65. 2024.01.23 Expert Report of Martin C. Rinard, GOOG-AT-MDL-C-000038996
66. 2024.01.23 Expert Report of Mark A. Israel_Redacted, GOOG-AT-MDL-C-000038238
67. 2024.01.23 Expert Report of Judith A. Chevalier_Redacted, GOOG-AT-MDL-C-000037998
68. 2024.01.23 Expert Report of Itamar Simonson, GOOG-AT-MDL-C-000037340
69. 2024.01.23 Expert Report of Douglas Skinner, GOOG-AT-MDL-C-000037286
70. 2024.01.23 Expert Report of Anthony J. Ferrante, GOOG-AT-MDL-C-000037233
71. 2024.01.23 Expert Report of Anindya Ghose_Redacted, GOOG-AT-MDL-C-000036954
72. 2023.12.22 Expert Report of Timothy Simcoe_Redacted, GOOG-AT-MDL-C-000036793
73. 2023.12.22 Expert Report of Thomas Respass_Redacted, GOOG-AT-MDL-C-000036625

- 74. 2023.12.22 Expert Report of Rosa Abrantes-Metz_Redacted, GOOG-AT-MDL-C-000036305
- 75. 2023.12.22 Expert Report of Robin S. Lee, PhD_Redacted, GOOG-AT-MDL-C-000035792
- 76. 2023.12.22 Expert Report of R Ravi_Redacted, GOOG-AT-MDL-C-000035536
- 77. 2023.12.22 Expert Report of Gabriel Weintraub_Redacted, GOOG-AT-MDL-C-000035253

Pleadings

The live pleadings (complaint and answer) within the matter of The State of Texas, et al. v. Google, Case Number: 4:20-cv-00957-SDJ, including the Fourth Amended Complaint.

Bates Stamped Productions, including access to Plaintiffs' entire production database, as well as the following documents and Google and third-party productions made since June 7, 2024:

- | | |
|-----------------------------|-----------------------------|
| 1. [REDACTED]_GOOG_0027446 | 37. [REDACTED]_01274568 |
| 2. [REDACTED]J012641326 / | 38. [REDACTED]_00528334 |
| [REDACTED]_000000680 | 39. FTC_US-GOOGLE-000004531 |
| 3. [REDACTED]GOOG_00478712 | 40. GOOG-AT-MDL-001263607 |
| 4. [REDACTED]GOOG_00986815 | 41. GOOG-AT-MDL-001390730 |
| 5. [REDACTED]JGOOG_01484801 | 42. GOOG-AT-MDL-001391213 |
| 6. [REDACTED]_00078430 | 43. GOOG-AT-MDL-001933227 |
| 7. [REDACTED]_00079937 | 44. GOOG-AT-MDL-002105969 |
| 8. [REDACTED]_00116640 / | 45. GOOG-AT-MDL-002105984 |
| [REDACTED]_00116632 | 46. GOOG-AT-MDL-002124829 |
| 9. [REDACTED]_00277880 | 47. GOOG-AT-MDL-002390899 |
| 10. [REDACTED]GOOG_00327692 | 48. GOOG-AT-MDL-002393442 |
| 11. [REDACTED]_00327637 / | 49. GOOG-AT-MDL-003161451 |
| [REDACTED]_00327634 | 50. GOOG-AT-MDL-004074544 |
| 12. [REDACTED]_00327690 | 51. GOOG-AT-MDL-004232880 |
| 13. [REDACTED]_00334404 | 52. GOOG-AT-MDL-004233138 |
| 14. [REDACTED]_00482531 | 53. GOOG-AT-MDL-004300268 |
| 15. [REDACTED]_00528526 | 54. GOOG-AT-MDL-004416785 |
| 16. [REDACTED]_00540345 | 55. GOOG-AT-MDL-004436768 |
| 17. [REDACTED]_00585545 / | 56. GOOG-AT-MDL-004555181 |
| [REDACTED]00585544 | 57. GOOG-AT-MDL-006099844 |
| 18. [REDACTED]_00797666 | 58. GOOG-AT-MDL-006161050 |
| 19. [REDACTED]_00808277 | 59. GOOG-AT-MDL-006334729 |
| 20. [REDACTED]_00813671 | 60. GOOG-AT-MDL-006873424 |
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| 23. [REDACTED]_00892345 | 63. GOOG-AT-MDL-007343585 |
| 24. [REDACTED]_00969349 | 64. GOOG-AT-MDL-007346556 |
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| 26. [REDACTED]_01021169 | 66. GOOG-AT-MDL-007375672 |
| 27. [REDACTED]_01062704 | 67. GOOG-AT-MDL-007387750 |
| 28. [REDACTED]_01064247 | 68. GOOG-AT-MDL-007397182 |
| 29. [REDACTED]_01064318 | 69. GOOG-AT-MDL-007397197 |
| 30. [REDACTED]_01080688 | 70. GOOG-AT-MDL-008148533 / |
| 31. [REDACTED]_01082050 | GOOG-AT-MDL-008148529 |
| 32. [REDACTED]_01089475 | 71. GOOG-AT-MDL-008517788 |
| 33. [REDACTED]_01103919 | 72. GOOG-AT-MDL-008588684 |
| 34. [REDACTED]_01131531 | 73. GOOG-AT-MDL-008682082 / |
| 35. [REDACTED]_01200160 | GOOG-AT-MDL-008682071 |
| 36. [REDACTED]_01254367 | 74. GOOG-AT-MDL-008754374 |

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